Indian Archaeology

1981-82 — A REVIEW



INDIAN ARCHAEOLOGY 1981-82

—A REVIEW

EDITED BY

DEBALA MITRA

Director General

Archaeological Survey of India

ARCHAEOLOGICAL SURVEY OF INDIA
GOVERNMENT OF INDIA
NEW DELHI
1984

Cover : Angkor Wat, Kampuchea

Price : Rs. 70.00

PRINTED AT NABA MUDRAN PRIVATE LTD., CALCUTTA, 700004

PREFACE

This annual publication was designed as a compendium of information about archaeological activities carried out by the Archaeological Survey of India, State Departments of Archaeology, Universities and other learned institutions during the particular financial year. Over the years it has grown not only in bulk but also in importance: additional sections bearing new things have been incorporated and new outlook and ideas are found permeating in different reports indicating winds of change in various spheres. Even one can notice changes in terminology and shift in emphasis. Though the general arrangement has been retained, new chapter or chapters have sometimes to be added or deleted. This issue, for instance, contains a chapter on 'Expedition outside India' not appearing since the issue *1977-78*. In February 1982 a team of archaeologists from the Survey was deputed by the Government of India to Kampuchea to prepare a comprehensive project report on the preservation of the world-famous temple of Angkor Wat. Chapter X of this issue deals in brief with this aspect.

From the issue of *1955-56* onwards a chapter on 'Architectural Survey of Temples' had been appearing. In order to incorporate the results of the survey of buildings by the Building Survey Project of the Archaeological Survey, the chapter-heading has been changed to 'Architectural Survey'.

This publication, as usual, is the work of several hands in that it is the combined efforts of contributors, compilers and others. Such a compilation quite naturally may suffer from errors and omissions for which I, on behalf of all concerned and on my own behalf, would like to tender my apology. However, I have no responsibility for the factual information, as these are supplied by the contributors who are themselves engaged in their respective pursuits.

In my responsibility as editor I have been ever conscious of the extent to which I depended on the labour and goodwill of others. For the publication of this issue I record my deep appreciation to: H. Sarkar, J. S. Nigam and Arundhati Banerji for compilation, editing and going through the proof; M. C. Joshi, K. M. Srivastava and B. S. Verma for assisting in editing some of the chapters; and S. R. Varma for production and going through the press.

New Delhi
26 October, 1983

DEBALA MITRA

CONTENTS

INDIAN ARCHAEOLOGY 1981-82

-A REVIEW

I. EXPLORATIONS AND EXCAVATIONS

ANDHRA PRADESH

1. EXPLORATION IN DISTRICT GUNTUR.—K. Krishna Murthy of South-eastern Circle of the Archaeological Survey of India[1] assisted by P. N. Kamble and D. Hanumantha Rao in the course of exploration discovered an extensive Ikshvaku site near Guttikonda village in Gurjala taluk. The surface collection included red-ware, Black-and-red Ware and black ware apart from lead coins, beads and terracotta objects like caprisoned horse and an elephant.

A Buddhist site at Peddakodamagundla, a village, 10 km from Karempudi, was discovered. The team also found a megalithic site containing a cluster of cist burials, just half-a-kilometer away from road. A little further away a menhir was located.

2. EXCAVATION AT VADDAMANU, DISTRICT GUNTUR.—Birla Archaeological and Cultural Research Institute, Hyderabad, under the direction of T. V. G. Sastri, and assisted by M. Kasturi, J. Prasad Rao and Virendar, excavated in two different areas of the hill towards the south-west of the village: (i) at the foot of the hill on the north-eastern side at a height of 55 m and (ii) at the northern terrace of the hill at a height of 76 m above the M.S.L. At the first site ancient pottery and lead coins were picked up from the surface, while a huge limestone pillar was noticed at the second site. Moreover, linear sketches of the stupas on the huge boulders towards the south-western corner of the terrace have been noticed (pl. I). As a result of these discoveries the excavation was planned. At both the sites the excavations have brought to light the remains of religious structures spread over a period of 500 years beginning from the second century BC onwards.

At the first site near the foot of the hill the earliest structures encountered are two votive stupas of 2-6 m diameter each. Attributed to the first century AD, these stupas were built of bricks measuring 50 X 27 X 8 cm and contain two concentric circles with the inner one having a diameter of 1 m. One of them shows plaster flooring and regular opening like those discovered at Salihundam. It is not clearly known to what height they had been built, but their circular shape is preserved only by two or three courses of bricks. During the second phase, two stone revetments were provided on the western side of the stupas with blocks of granite.

The phased structural activity is perceptively noticed at the second site on the terrace of the hill. The earliest activity at the site shows the remains of a stupa, proportionally much bigger. It is 13-6 m in diameter and has three concentric circles. The central hub is formed by weathered circular boulders. The concentric circles around the hub were also built of weathered rock with brick linings on either side.

The second phase of structural activity is confined to a sixteen-pillared hall, two wings of a *vihara* towards the east and the west. The above structures were raised after dismantling the upper portion of the earlier stupa. The limestone pillars were installed over a filling

---

[1]The Archaeological Survey of India is referred to in the following pages as the 'Survey'.

of uniform whitish-red earth. The pillar-bases were reinforced with brickbats deep in the earth filling. Possibly some bricks belonging to the circles of the earlier stupa were dismantled at certain places and used in veneering the verandahs of the *vihara.* The walls of the *vihara* are built of mud and plastered with lime. Tiles were used both for the roof and flooring.

Towards the stupa on the northern side of the terrace there are a number of structures. They mainly belong to the same period as that of the *vihara.* Subsequently, there are some additions to the walls. The structures of the *vihara*-phase are a flight of steps running westwards showing clearly the entrance to the pillared hall and *vihara* on the terrace and a central brick platform on the slope connected with steps to the top. The structures indicate that the people of the second phase were treading over the sacred stupa of the earlier people.

As regards the first phase, the association of black-and-red and N.B.P. wares with punch-marked coins found in the excavation near the stupas indicate possibly the date towards the closing years of the Mauryan period (second century BC) . In this context, more authentic is an inscription found near a cavern cut on the rock-surface. It contains ten letters in Asokan Brahmi, reading as *raino damaka sa anubadhi. Damaka* might have been a king ruling around Amaravati. The use of marble limestone pillars as those of Amaravati and Nagarjuna-konda, the red polished and red ware pottery and the presence of coins showing clear Ikshvaku legends in Brahmi suggest a period between the end of second century AD and the beginning of third century AD.

Thus, the excavations at Vaddamanu have brought to light stupas of the Mauryan period. Structurally, they are different from the stupas of Amaravati and Nagarjunakonda. The second phase of the construction of the pillared hall and the *vihara* shows similarities with the Buddhist structures. The coins may be attributed to the period of the Ikshvakus of Nagarjunakonda.

Another inscription in later Brahmi characters is on a railing slab found in the excavation outside the *vihara.* It possibly refers to the village name as Salipura (town of rice) in olden times, as etymologically the present name Vaddamanu is the equivalent to its ancient form Salipura.

3. EXCAVATION AT MURAVKONDA, DISTRICT KURNOOL.—In continuation of previous year's investigations *(Indian Archaeology 1980-81—A Review,*[1] p. 3), R. S. Pappu and J. V. Prasad Rao of the Deccan College Post-graduate and Research Institute, Pune, conducted a small-scale excavation at Muravkonda in the Middle Palaeolithic tool-bearing High Level Gravel occurring at an elevation of about 20 m above the present bed of the Krishna and about 0-50 to 0-75 km away from the present channel. Two trenches measuring 2x2 m and orientated north-south were laid in the High Level Gravel on the right bank of Krishna at Muravkonda, where there was fairly good accumulation of tools on the surface. This excavation revealed the following important geo-archaeological aspects.

The stratigraphic sequence observed consists of weathered limestone at the base overlain by sandy pebbly gravel with a thickness of about 0-95 to 1-20 m and further capped by greyish silt of 10 to 20 cm thickness. This gravel is poorly sorted, crudely stratified and ungraded. It is made up of boulders, pebbles and sand. Size analysis has shown that 45 to 50 per cent of the gravel is loosely consolidated. The matrix consists of coarse sand and cementing material is ferruginous. Gravel analysis has indicated that the larger components in the coarse grade, i.e. those greater than 4 cm, are subangular to subrounded in shape and smaller components, of the size-range of 2-4 cm, are subrounded to rounded in shape. The gravel as a whole is rich in silica family minerals, particularly quartz (80 per cent). The pebbles show intense brown patination and high gloss. The gravel appears to be strongly weathered as evidenced by obscure lamination, decalcification and presence of weathering rind of 4-5 mm thickness in majority of the pebbles.

[1]This publication is referred to in the following pages by the year only.

The Middle Palaeolithic cultural material is distributed throughout the whole thickness of the gravel deposit and not confined to the surface or embedded in the top 30-40 cm of the gravel-bed as believed earlier. The artefacts from the lower as well as upper levels are almost identical in typology, technology, state of preservation and raw material. A few artefacts of Acheulian type were recovered from the lower portion of the gravel deposit. It, therefore, appears that the late phase of Acheulian in this region might be contemporary with the early phase of Middle Palaeolithic.

High Level Gravels which have extensive distribution in this region represent abandoned channel of the ancient Krishna. In the absence of any datable material associated with High Level Gravel, it is rather difficult to assign a precise date for this aggradational phase. Field relationship of high level gravel with the late Pleistocene alluvial fill and presence of a few Acheulian artefacts in the lower portion of the gravel indicate that it is older than the alluvial fill, i.e. older than 40,000 years BP. The present investigations thus have pushed back the antiquity of Middle Palaeolithic culture in this part of the peninsula.

4. EXCAVATION AT RAMAPURAM, DISTRICT KURNOOL.—In continuation of last year's work, *(1980-81,* pp 3-7), the Excavations Branch I of the Survey, Nagpur, excavated habitation site as well as megalithic burials, under the direction of B. Narasimhaiah assisted by B. P. Bopardikar, S. K. Lekhwani, D. K. Ambastha, S. K. Mitra, K. Ismail, Mohinder Singh, S. V. Sutaone, P. M. Bhope, K. M. Girhe, R. K. Dwivedi, R. K. Roy, H. S. Bora, Pyare Singh, M. U. Qureshi, A. U. Ganar and Subhra Naskar. This season's excavation carried out down to the top of I B level in more than one hundred and twenty trenches of 10 m sq. each, besides conforming to the last year's result, revealed interesting data on the settlement pattern and the way of life of the people of the I C phase.

Period I C could be divided into three sub-phases, 1, 2 and 3, respectively having an average deposit of 5, 15 and 15 cm. In sub-phase 1 the dimension of the oval-shaped huts varied from 8-6 X 7-2 to 4-0 X 3-4 m and circular ones from 7-2 to 3 m in diameter and in sub-phase 2 the former from 9-6 X 8 to 3 X 2-6 m and the latter from 6-6 to 3-6 m. In sub-phase 3 the dimension of the oval huts varied between 9 x 8-8 and 3-5 X 2-6 m and circular ones between 6-8x3 m in diameter. It was observed that the huts were built in clusters leaving an area of 23 X 15 m in the centre unoccupied in all the three sub-phases. The huts of the later two sub-phases, in some cases, were constructed over the place where the earlier huts had been existing. The number of huts in sub-phase 2 increased from thirty-one to seventy-two and sharply declined to forty in sub-phase 3. Among the plans exposed, one was having a rectangular chamber marked by slab pieces placed on edge. This was found to have been extended subsequently and even the rectangular chamber was broadened. As there was no activity connected with fire either inside or outside the hut, this was probably used for a purpose which could not be determined.

Another interesting feature noticed is that the people used to bury full pots with a slight damage in a pit inside the hut. Other noteworthy structures encountered are two kilns which could not be fully exposed and two deep pits (nearly 3 m deep) meant probably to serve as wells.

Among the pottery types recovered (fig. 1) mention may be made of miniature pots, vase with ring-base, basin with applique design, ribbed miniature pot, vase with applique' knobs all over the body, triangular pot, bowl with horizontal straight spout and multi-lipped bowl with perforations, besides painted vases (fig. 2).

Important antiquities recovered include: copper objects (pl. II) such as bangles, armlets, coiled wire beads (7 cm long) and parers or razors; beads of semi-precious stones, shell, terra-cotta, steatite and paste; terracotta human figurine and bulls including a painted one; and polished stone celts including two made on quartzite.

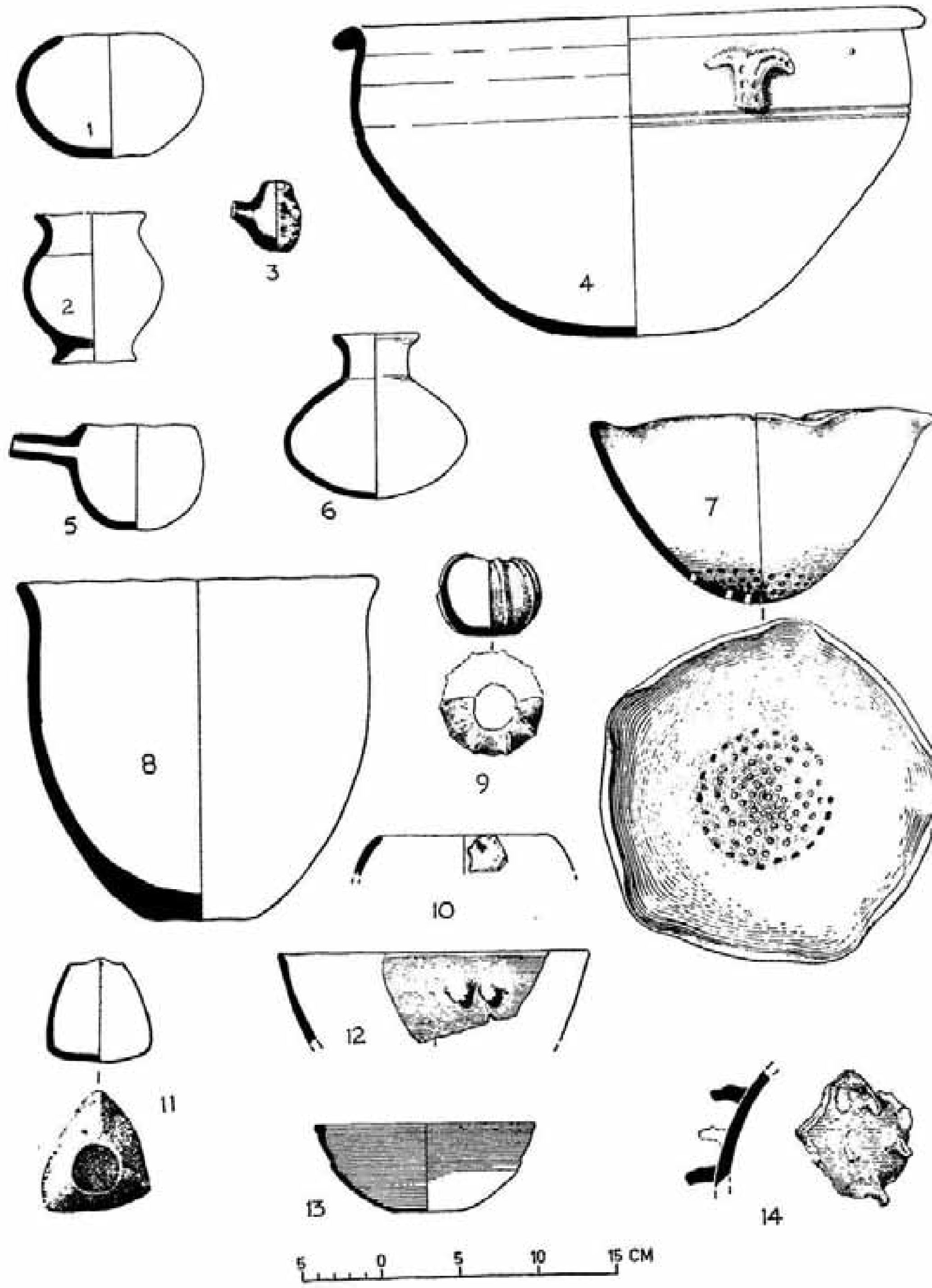


FIG. 1. *Ramapuram : pottery types*

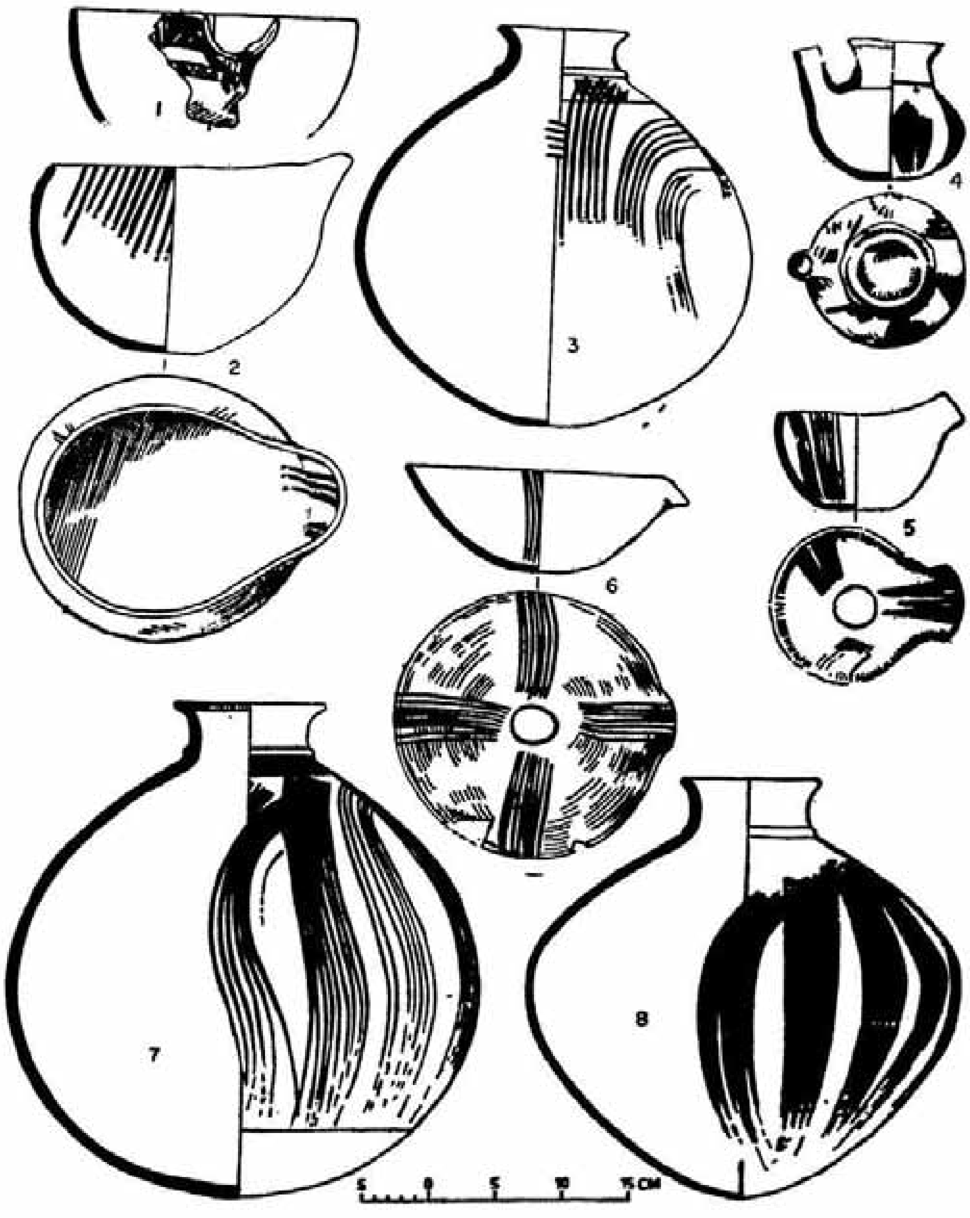


FIG. 2. *Ramapuram : pottery types*

In this season one more burial custom, a shallow pit for extended burial of an infant (pl. Ill A), was noticed in addition to the four burial types (pit, cist, vertical single urn and horizontal double urn-burials) found earlier inside the habitation. This type differs from the others in depth, burial furniture and distributional pattern; they are concentrated in a particular area, and burial furniture usually is a spouted vessel. However, one of the shallow pit-burials (pl. 111B) had bones of an infant in a channel-spouted bowl, and a skull of a goat and a painted spouted vase as burial furniture. Among the cist burials two sub-types were noticed. One is transepted (pl. IV A) and the other is twin cist (pl. IV B). It is interesting that one of the cist burials had a complete skeleton with legs flexed, which is unusual. It had a bow-like iron object besides other burial furniture. One of the pit-burials also had an extended skeleton kept on ash-bed, the legs of which were covered with ill-burnt split bamboo pieces. A *parasu*-like. iron object, an iron tripod, copper bells (seven in number kept in a red pot without postfiring paintings in soot) were found inside the pit with usual burial furniture. Other significant objects recovered from the burial include lid with bird-finial, three-legged jars, perforated vase, dish-on-stand in black-and-red ware, painted spouted vessel and vases in burnished grey were (pl. V A). Altogether seventy-three burials belonging to Period I G have been exposed.

Among the twenty-seven megalithic burials, in fairly good state of preservation, strewn in a field, 1-5 km south-west of the above-mentioned chalcolithic habitation site, on the western bank of the stream called the Uru-vanka, four were excavated. All the four burials turned out to be pit-burials and no skeletal remains were found.

Megalith I (pl. V B), situated on the south-western extremity of the megalithic field, is the biggest one with the cairn-packing spreading over a diameter of nearly 16 m with an elevation of 1.15 m at the centre, giving an appearance of a heap of slab pieces.

Excavation revealed on plan a north to south oriented rectangular pit measuring 2.65 X 2.30 m cut into disintegrated limestone bed-rock. At a depth of 95 cm from the surface a 30.cm wide working platform is left on the northern side. Thus, further below, the pit oriented east-west, and dug upto a depth of 90 cm, measures 2.30 X 2.00 m. The total depth of the pit is 1-85 m. The burial furniture, including pots and iron objects kept on the uneven floor of the pit, is arranged in tiers. Then the pit is filled up to 1.15 m with hard black clay. The hard black clay is filled from all sides very meticulously to form a shallow bowl-like depression. This depression is paved with slab pieces. In fact, while this level was reached during excavation, it gave an appearance of a pit paved with the slab pieces. This slab paving merges with the slab pieces covering a rectangular ledge provided all around the pit on the surface. The pit is filled with compact brownish earth. A symbolic passage flanked by slab pieces is provided on the eastern side running from the pit to the inner face of the outer circle. The outer circle, which is 2.25 m in width and 5.57 m in internal diameter, is made up of coursed slab pieces, the maximum extant courses being nine. The whole structure is then covered with cairn packing of slab pieces (fig. 3).

The burial furniture include thirty-eight vases, of which seven were globular vases in Black-and-red Ware, one tulip-shaped vase with corrugated body in black ware, six pottery ring-stands, four three-legged jars, a perforated vase and sixteen other vases, all in red ware showing slip on some of them; and iron objects such as a small dagger and a long lance (1-53 m long) with solid cylindrical handle. The interesting feature in the arrangement of the pots is that the three-legged jars were placed two each on either side of a storage jar in red ware showing incised decoration and containing three miniature vases and covered by a lid.

The other three excavated megaliths revealed similar architectural features with variations in size and depth of the circle and pit respectively. However, they differ in the burial furniture in the sense that one of them, Megalith III (fig. 3), yielded in addition to the usual pottery, twenty-six conch-shells, seventeen of them being kept in a pot near a long (1.1 m) javelin-

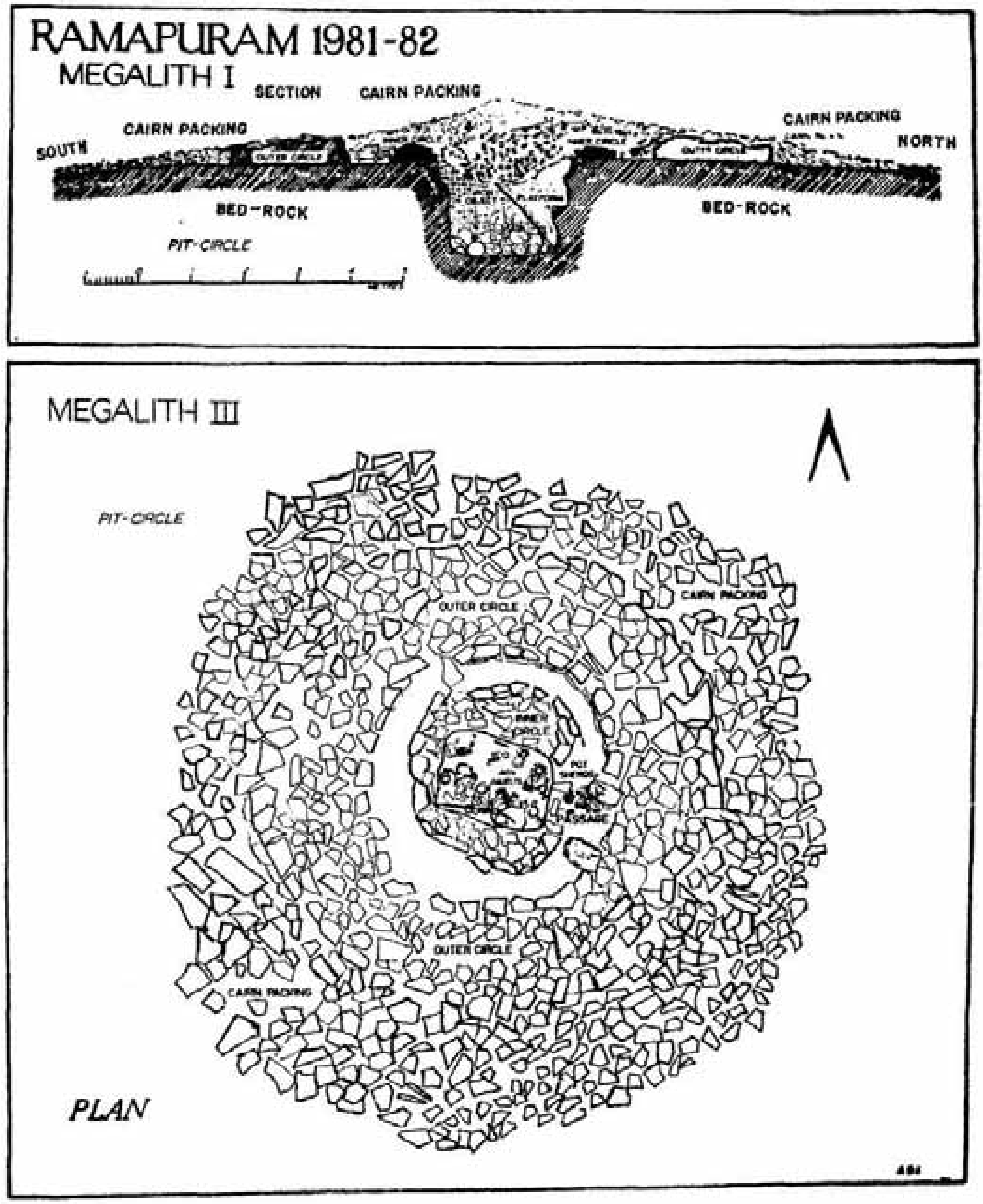

RAMAPURAM 1981-82
MEGALITH I
SECTION
CAIRN PACKING
CAIRN PACKING
SOUTH
CAIRN PACKING
NORTH
BED-ROCK
BED-ROCK
PIT-CIRCLE
MEGALITH III
PIT-CIRCLE
OUTER CIRCLE
CAIRN PACKING
OUTER CIRCLE
CAIRN PACKING
PLAN

Fig. 3

like iron object (10 cm wide); strap-like objects with crescentic ends made of iron; and a shallow circular stone mortar. It is interesting to note that the conch-shells have horizontal as well as vertical perforations, so that they could be used either vertically or horizontally in a garland.

5. EXPLORATION IN DISTRICT KURNOOL.—The Excavations Branch I of the Survey, Nagpur, under the guidance of B. Narasimhaiah assisted by D. K. Ambastha, S. K. Mitra, R. K. Roy, M. U. Qureshi, P. M. Bhope, K. M. Girhe, R. K. Dwivedi and A. U. Ganar, explored an area of nearly 2,000 sq. km in District Kurnool with a view to understanding the settlement pattern of the people of the chalcolithic culture represented at Ramapuram *(1980-81,* p. 3). Several sites with various cultures were discovered (see table below). It is worth noting that the chalcolithic people lived on the banks of small streams which ultimately join the river Pennar. In selecting a place for their settlement they gave much importance to three factors: (a) hill-range (small or big) in the vicinity; (b) meander of the stream; and (c) vast stretch of black cotton soil around such places. It was also observed that even if one of these factors did not satisfy they avoided such a place. The bigger stream seems to have not been favoured by these people. This aspect, however, needs further investigations. Further, the distance between one site to another is strikingly uniform, not exceeding 5 to 6 km. However, most interesting information gathered from the study of the material equipment of the people from each settlement is that there were many groups among the settlements, each group having three or four settlements which had close contact between them.

It was also observed that one or two early historical settlements came up in between two chalcolithic settlements, which would suggest that the yield from the fields increased due to superior technology and it could then support more settlements.

Village site	*Latitude*	*Longitude*	*Cultural assemblage*
Akumalla	15°9'30"	78°12'30"	Early historical
Alavakonda	15°08'	78°I4'	Early historical
Bilam	15°07'	78°07'30"	Chalcolithic
Bondeladinna	15°I2'	78°14'15"	Early historical
Cherlopalle	15°10'	78°05'	Mesolithic and Chalcolithic
Giddaluru	15°05'	78°00'30"	Early historical
Kalvatala	15°03'45"	78°09'	Early historical
Kammavaripalle	15°02'30°	78°14'15"	Early historical
Kolimigundla	15°04'30"	78°07'15"	Early historical
Kotapadu	15°03'30"	78°12'	Early historical
Lingambadi	15°01'45"	78°10'45"	Mesolithic
Mettupalle	15°14'30"	78°O7'15"	Mesolithic and early historical
Muchchelapuri	15°09'	78°17'	Chalcolithic
Mukkamalla	15°09'	78°16'	Chalcolithic
Nayanipalle	15°05'30"	78°04'30"	Mesolithic
Nichchenametla	15°13'	78°08'	Chalcolithic and early historical
Nilugondla	15°14'	78°14'	Chalcolithic, Megalithic and early historical
Owk	15°14'	78°09'	Mesolithic, Chalcolithic, Megalithic and early historical
Rallakotturu	15°02'30"	78°12'	Mesolithic
Ramapuram	15°08'	78°07'	Middle Palaeolithic, Mesolithic and Megalithic
Sunkesula	15°08'	78° 13'	Chalcolithic
Vasantapuram	15°12'15"	78°13'30"	Early historical

6. EXPLORATION IN DISTRICT PRAKASAM.—K. Krishna Murthy of South-eastern Circle of the Survey, assisted by G. V. Srinivasa Rao and P. Sitaramamurthy in the course of extensive exploration along the Gundlakamma river basin brought to light a Buddhist centre at Ramathirtham near Cheemakurthi village of Ongole taluk. This place has yielded an image of Bodhisattva Avalokitesvara while digging for the renovation of the Moksharanalingesvara temple of the Telugu-Chola period. Large-sized bricks and Red Polished Ware were also recovered.

G. V. Srinivasa Rao of the South-eastern Circle of the Survey has explored a neolithic site near Chhemakurthi foothill in the course of problem-oriented survey. This has yielded handaxes and pottery.

In the course of Village-to-Village Survey in District Prakasam, P. Sitaramamurthy of South-eastern Circle of the Survey has discovered some early historical and medieval sites.

The explored sites along with their cultural assemblage are as under.

Taluk	*Village/site*	*Cultural assemblage*
Chirala	Bodavada	Late medieval and temple
,,	Garnepudi	Medieval and temple
,,	Inagallu	Early historical
,,	Kadavakuduru	Late medieval
,,	Nagandla	Medieval and temple
,,	Nutalapadu	Late medieval and temple
,,	Paruchuru	Late medieval and temple
,,	Pusalapadu	Early historical, medieval and temple
Darisi	Kocherlakota	Medieval, temple and inscription
Kandikuru	Kondapi	Late medieval and temple
,,	Paletipadu	Late medieval and temple
,,	Uppalapadu	Early historical
Ongole	Gonugunta	Early historical, medieval, inscription and temple
,,	Pidatala Gudipadu	Early historical
,,	Pidaalapudi	Early historical
,,	Pulikonda	Megalithic

ASSAM

7. EXPLORATION IN DISTRICT DARRANG.—The Department of Archaeology and Museum, Government of Assam, in continuation of the previous work *(1979-80,* p. 11) explored two areas viz., (i) Mangaldoi-Orang region and (ii) Tangla-Kalaigaon region. With this season's work the exploration in the western part of the district between rivers Belsiri in the east and Barnadi in the west has been completed and the details are as follows :

Region	*Village/site*	*Cultural assemblage*
Mangaldoi-Orang	Geruwa	Architectural remains of a stone temple and brick ruins
	Dewalkhanda	Sculptural and architectural remains of a temple, *circa* tenth-eleventh century AD

Region	Village/Site	Cultural assemblage
Tangla-Kalaigaon	Baman	Sculptural and architectural remains of two stone temples, *circa* eleventh-twelfth century AD
"	Burhinagar	Architectural remains of a stone temple, *circa* twelfth century AD
"	Dhalpur	Sculptural and architectural remains of a stone temple, *circa* eleventh-twelfth century AD
"	Garukhuti	Sculptural and architectural members of a stone temple
"	Narikali	Architectural remains of a stone temple, *circa* twelfth century AD
"	Tamreswar	Sculptural and architectural remains of a temple, *circa* tenth century AD

BIHAR

8. EXCAVATION AT ANTICHAK, DISTRICT BHAGALPUR.—The Vikramshila Excavation Project of the Survey, Patna, undertook the clearance work in the form of removal of the debris accumulated on either side in front of the main north gate of the *Mahavihara.* Besides, the normal clearance work was carried out in the whole of the *Mahavihara-complex.* In the course of this clearance work a small temple having an area of 7.15 X 5.10 m came to light. Its extant height was 0-80 m with 14 courses of bricks laid in mud mortar. The width of the wall was 0-80 m, the size of the bricks being 31 X 22 X 5 cm. The temple belonging to the latest phase is *pancha-ratha* on plan and faces east.

To the north-east of the north gate, clearance work brought to light a southward extension of the already-exposed votive stupa-complex. This year as many as seventeen votive stupas have been exposed in the area. As they are badly damaged, only their plans could be traced. Though varying in sizes, all of them are square on plan. To the south of these stupas there is a wall with a maximum of eighteen courses of baked bricks extant. The exposed portion of this wall which is oriented east-west measures 18-45 X 0-70 m. Beyond this wall, fifteen more votive stupas were encountered during the clearance and these are also badly damaged.

Notable finds include medium-sized terracotta plaques with stupas in relief (pl. VI A). Below the stupa is the Buddhist creed, inscribed in proto-Devanagari characters of the tenth-eleventh century AD. Almost all these plaques are identical in size; a few of them are broken and the rest intact. Some damaged human heads detached from the terracotta plaques have also been found. Limestone head of a crowned Buddha is a noteworthy find.

Rings and points of antler in different sizes have been picked up in a fairly large number from one place near the main gateway of the monastery. They all belong to the late phase.

A few pieces of complete dishes and lamps-on-stands have been found in the course of clearance work. An iron arrowhead and a knife-blade have also been found.

9. EXCAVATION AT TARADHI,, DISTRICT GAYA.—Ajit Kumar Prasad of the Directorate of Archaeology and Museums, Government of Bihar, Patna, assisted by Lakshaman Prasad Singh, Kedar Nath Singh, Ram Swarup Singh, Srikant Bhagat, Uma Shankar Pandit, Narayan Chandra Ghosh, Raghunath Prasad Verma, Chandra Mohan Lai, Abdul Quddish Ansari, Bachchan Kumar, Rajiv Ranjan Sinha under the guidance of Sita Ram Roy, undertook a trial

excavation at Taradih mound to the south-west of the famous Mahabodhi Temple at Bodh Gaya with a view to ascertaining the cultural sequence and the potentiality of the site.

The excavation revealed deposits of five cultural periods.

Period I represented a 70-cm cultural deposit of yellow soil. Excavation revealed an economy in which agriculture, hunting and fishing played an important role. Successive rammed earthen floors were met with. Available evidence indicated that contemporary people lived in huts made of wattle and daub. Ovens of various sizes were found at different levels of the period. Iron in any form was not encountered, whereas a fish-hook of copper and a blade of carnelian were picked up from this level.

The pottery in general was wheel-made and well-fired, but the handmade specimens also occurred. The red ware was the dominant industry, while black-and-red and black wares were also present. The pottery had usually fine and thick slip ranging from chocolate through crimson red, light red or orange to ochre in colour on the sherds of red ware as well as on red portions of the black-and-red ware. Jars were made in two parts: the rim was shaped on wheel while the body was modelled by hand, and then both the parts luted carefully.

The main pottery types included dish-on-stand, bowl with a pedestal base, bowl with globular or ovoid body and out-curved or featureless rim, ring-based bowl, perforated bowl, spouted vessel, shallow and deep dish, small vase, small-to-medium size jar with sharp carina-tion at the neck, flared-out rim etc. The shoulders of a few jars of red ware showed significant applique designs consisting of twisted rope, pinched and cut signs, knob patterns, post-firing scratched design etc. Some pieces of black-and-red, red and black wares bore white paintings in the form of wavy lines, straight and oblique strokes and dots.

Among notable stone antiquities were a neolithic celt, a carnelian blade, a quern and a few pestles and a hammer-like object. The important bone objects were represented by socketed as well as tanged arrowheads, barbed arrowheads, points, chisels etc. The discovery of a single copper fish-hook was very significant, as it qualifies the site for its chalcolithic character. The notable finds of terracotta were beads and conical objects. A few disc-shaped beads, of indeterminate material, having perforation at the centre were also noteworthy.

Period II was marked by the appearance of Northern Black Polished Ware along with its associated fine and thin black-slipped ware. The black-and-red ware of the preceding period continued during this period, but there was a marked change in its types and fabric. The pottery, in general, was made of fine-grained levigated clay and well-fired. Some pieces of black ware were painted in creamy white designs representing loops and group of intersecting loops. Some red ware pieces also bore black paintings on the exterior. Specimens of red ware with or without slip were also found. The main types represented vase, *handi,* rimless *handi, lota,* basin, lipped-bowl, conical bowl etc. This period also yielded a few pieces of black ware having graffiti marks and revealed at least two ring-wells, rings of one of which are missing. A few iron implements like nails, and a leaf-shaped spearhead were also discovered, apart from coins and a few copper bangle pieces along with some fragments of crucibles. Other minor antiquities of the period were beads of semi-precious stones, bangles and rings of different materials. Some neolithic axes of different sizes, which came from this period, are survivals of an earlier tradition.

Period III was represented by the appearance of sprinklers, high narrow-necked *surahi* and other pottery of the Kushana period. Among notable antiquities of the period mention may be made of beads of terracotta as well as of semi-precious stones, conical objects, ear-ornaments, bangle pieces, dabbers and discs of different materials.

Period IV was marked by the appearance of the Gupta and late Gupta antiquities. Notable finds included terracotta seals, sealings, beads of semi-precious stones, bangle pieces of bone and terracotta, stone images of Buddha, Avalokitesvara, votive stupas of stone, replica of temple in stone, *chhatravali,* a die of bone etc. One of the sealings depicting the figure of Buddha and Buddhist creed in contemporary script is noteworthy (pl. VI B).

Period V was characterized by the remains of the Pala structures, made of re-used bricks, in five phases. The floor, made of broken bricks and brickbats, showed the use of lime and *surkhi* mortar. Tiles were used for roofing. The important finds of this period were an inscribed image of seated Buddha (pl. VI C), unfinished and broken image of Tara, headless figure of Buddha in *bhumisparsa-mudra,* inscribed beads of stone, plain beads of stone and terracotta etc.

10. EXCAVATION AT NALANDA, DISTRICT NALANDA.—The Mid-eastern Circle of the Survey under the guidance of H. K. Narain, assisted by B. Nath and Sunil Kumar, conducted excavation at Sarai mound at Nalanda to reveal the partially-exposed enclosure wall of the main temple-complex. The excavation revealed the enclosure wall measuring 60 m in length, 1-65 m in width and 1 -92 m in height, besides the *pradaksina-patha* running east to west and north to south.

The *pradaksina-patha* exposed around the main temple is made of *lime-surkhi* mortar and is 6 m wide running parallel to the enclosure wall in the western direction. The thickness of the floor of the *pradaksina-patha* measured 90 cm. The eastern periphery of the temple has also revealed two shrines in the extreme western part of the mound. While cleaning the old baulk of the earlier excavation towards the north-east near the *pradaksina-patha* level, the other phase of the rammed floor having evidence of cells, came to light. However, the clear plan of the cells could not be ascertained. The commonly-used bricks are of the sizes of 42 X 28 X 7 cm, 41 X 26 X 7 cm, 39 X 26 cm etc. At a distance of about 2-45 m, the monastic complex of the temple, outside the enclosure wall, was also observed; cells were found with huge earthen jars yielding carbonized wheat, rice and barley.

Apart from late red ware pottery, this year's excavation has also yielded a few sherds of N.B.P. Ware and sherds of black and other wares associated with plain grey ware. All these sherds were found at a depth of 3 m below the present high level. While going deep just below 3 m, a few structural remains dated to the early medieval times were observed.

The excavation has also yielded a large number of terracotta animal figurines e.g. dog, ram, bull, elephant and horse. Also, the excavation brought to light a good number of stone sculptures. Mention may be made here of a remarkable image of a deity mounted on a standing lion probably Vagesvari of the Tantrayana cult (pl. VII).

11. EXCAVATION AT APHSAD, DISTRICT NAWADAH.—In continuation of last season's work *(1980-81,* p. 9), Prakash Charan Prasad assisted by Jamil Akhtar, Raghunath Prasad Varma and Narayan Chandra Ghosh of the Directorate of Archaeology and Museums, Government of Bihar, under the general supervision of Sita Ram Roy, undertook excavation work at Aphsad.

Two trenches were laid out, which brought to light the wall of the lowermost *pradaksina-patha* of the five-tiered Vishnu temple. An offset-designed wall running west-east, similar to its northern counterpart, was exposed. Both the trenches (APD H^2 and APD H^3), at the depth of 3.25 m and 3-27 m respectively, revealed the remains of brick-built structures, measuring 8 X 5 m and 8 X 0.55 m respectively. The former showed forty-four courses of bricks, while the latter forty-six, with a height of 2-50 m and 2-60 m respectively.

The antiquities include one crude terracotta figure, a few balls and a small fragment of a stone sculpture. The ceramic industry was represented mainly by the red ware of medium-to-fine fabrics. The important pottery types included vase, bowl, lid and lamp. Pottery lamps were found in good numbers which reflected the holy character of the Vishnu temple. Some N.B.P. pieces were also picked up from the debris.

12. EXPLORATION AT MAKANPUR, DISTRICT NAWADAH.—-H. K. Narain and B. Nath of Mid-eastern Circle of the Survey examined two Vishnu images and an image of Varaha of black basalt belonging to the Pala period.

13. EXPLORATION IN DISTRICT ROHTAS.—S. K. Sinha, a student of History, Delhi University, Delhi brought to light the following sites.—

Village site	*Cultural assemblage*
Gumharia	Architectural members and carved panels, one of them showing Ganesa and another a female figure
Jharpa	Remains of stone temple with carved architectural members, carved panels and images
Jhorghar	Remains of stone temple with several carved architectural members
Kanhenar	Remains of stone temple with several carved architectural members, carved panels depicting Ganesa and female figures and stone slab inscribed in early Devanagari characters
Karkar	Stone sculptured panels depicting Ganesa and other female deities
Telharkund	Rock-shelters, painted mostly in red and rarely in white, depicting human and animal figures, hunting scenes, jungle scenes with monkeys on trees

14. EXPLORATION AT MALUTI, DISTRICT SANTHAL PARGANA.—H. K. Narain of Mid-eastern Circle of the Survey re-explored the area and discovered a group of temples, about 74 in number, which are embellished with terracotta-plaques depicting themes from the *Ramayana* and the *Mahabharata.* The temples are datable between sixteenth and eighteenth century AD.

15. EXCAVATION AT CHIRAND, DISTRICT SARAN.—The Department of Ancient Indian History and Archaeology, Patna University, under the financial assistance from the University Grants Commission, for horizontal excavation at the site, resumed the work directed jointly by B. Narain and A. K. Singh, under the supervision of B. Sahai, and assisted by S. K. Kaviraj, J. P. Singh, R. N. Singh and P. K. Bose. The main objective of this year's excavation was to verify the results obtained from the previous excavations, particularly of the neolithic and chalcolithic phases. On the eastern mound towards the south-west, a trench was sunk close to the area excavated in 1971-73. The excavation revealed a five-fold cultural deposit.

Period I on the basis of ceramic evidence was divided into two phases. Phase I A was represented by a deposit of loose blackish clay with an average thickness of 0.40 m overlying the natural soil. The pottery included pale red ware, burnished red ware and a few sherds of coarse black-and-red ware. The predominant pottery was the pale red ware and the shapes in it included bowls with round base and perforated bowl with legs. These were made on turntable, but a few specimens were handmade. The burnished red ware was represented by fewer pieces, some belonging to the medium-size vases. Other finds were a ground stone rubber, a microlithic blade and a bone arrowhead. Phase I B was represented by 1-80-m thick deposit. The pottery was distinct by the occurrence of grey ware, burnished grey ware and blackish grey ware. However, the pottery of Phase I A along with its types continued. The distinctive pottery types of Phase I B were vases with flared rim, spouted vessels, perforated and lipped bowls. An overlap with the succeeding chalcolithic culture was discernible by the presence of dish-on-stand in black-and-red ware, and vases with flared rim showing fine slip both in red ware and black-and-red ware. Barring this influence, which appeared to be intrusive, the other traits remained the same as noticed in Phase I A. The other finds included ground stone as rubbers, micro-blade, fluted core, cores and flakes, bone arrowheads, points, awl, needle, stylus and fish-hook. Period I in its later Phase I B seems to be a transition phase from neolithic to chalcolithic, though no metal was found. An important discovery of Phase I B was a partially-

exposed mud-brick wall on the northern section, oriented east-west. The mud-brick wall oriented north-south could not be dated, as the southern section was disturbed. A post-hole, 0-35 m in diameter at the top and 0-15 m at the bottom, with a depth of 0-30 m was noticed adjacent to the western end of the wall. Another post-hole was noticed on the northern section with 0-30 m diameter at the top, 0-20 m at the bottom, its depth being 0-70 m. The mud-brick structure and post-holes were found at a depth of 7-38 m from the surface.

Period II was characterized by a blackish soil deposit of an average thickness of 0-90 m representing the remains of the chalcolithic culture. The pottery had preponderance of the black-and-red ware with dish-on-stand, small pedestalled cups, lipped bowls and vases with flared rim or straight neck. The post-firing painted designs consisted of circular and leaf patterns in yellow colour. The associated wares included red ware and black ware. The other finds of the period were bone point, a fully-ground celt with pointed butt and almost straight cutting edge, and a few fragments of copper.

Period III was characterized by loose yellowish clay deposit of an average thickness of 1.04 m with plenty of black ware sherds and the presence of iron. The pottery included, besides the black ware with smoky core, black-and-red and red wares which were in a limited quantity. Other finds included iron objects: iron ore nodules; copper antimony rods; bone points and bangles; terracotta human figurine, toy, an armlet and skin rubber; stone beads; and a neolithic stone bifurcator. The upper levels of this deposit also yielded a few sherds of the N.B.P. Ware having grey and red core.

Period IV was represented by a deposit, 1-80 m thick, and characterized by the occurrence of N.B.P. Ware, black-and-red ware, grey ware and red ware. Other finds included: iron objects; copper antimony rods; terracotta male figurines, animals, a Garuda, ear-ornament, and balls; stone beads and a fragmentary neolithic celt. A rammed brick floor was noticed in the northern half of the trench.

Period V was represented by a cultural deposit, 2-08 m thick, and yielded red ware of the early Christian era. Other important finds included: iron nail; stone beads; glass bangles; terracotta dog, a male head, balls, and reels.

The excavation at the site laid bare a five-fold cultural phase, each with a slight overlap, thereby indicating that the site remained continuously occupied.

16. EXPLORATION AT MATUKPURCHAPRA, DISTRICT SIWAN.—B. Nath of the Mid-eastern Circle of the Survey explored the area and discovered a few black stone *Siva-lingas* and archi tectural pieces belonging to late medieval period.

GOA, DAMAN AND DIU

17. EXPLORATION IN DIU.—Narayan Vyas of the Western Circle of the Survey, under the problem-oriented survey on the 'cultural contents of black-and-red ware in Rajasthan, Gujarat and Kutch' noticed a site yielding the black-and-red ware in the vicinity of the village Mehtawari (20=44' N; 70°55' E). The mound is approximately 20 m high and 60 m long. The exposed section on the west shows a deposit of alluvium and *kankar* in the lower portion. Sherds of black-and-red ware were collected from the deposit. The site also yielded a sherd of lustrous red ware, coarse red ware, grey ware and a sherd of N.B.P.(?) ware, besides a bead of conch-shell.

HARYANA

18. EXPLORATION IN DISTRICTS GURGAON AND MAHENDRAGARH.-—With a view to tracing the movements of the late Harappans and identifying the sequence of archaeological cultures

in south Haryana, C. Margabandhu and R. P. Sharma of the Delhi Circle of the Survey, assisted by D. P. Sinha, Budhi Singh, D. D. Dogra and Jhanku Ram, explored both the banks of Sahibi river from Siwari in the south to the borders of Delhi in the north. The explorations revealed late Harappan sites at Aurangapur II and Yaqubpur, and Rangmahal culture sites at Bandaula, Jhabeli (Chhabeli), Surah, and Untladoh.

HIMACHAL PRADESH

19. EXPLORATION IN DISTRICT KANGRA.—In the course of the Village-to-Village Survey conducted in tehsil Nurpur of District Kangra, A. K. Patel of North-western Circle of the Survey, under the guidance of S. N. Jaiswal, noticed antiquarian remains in eighteen villages. These offer a range of cultures from the Lower Palaeolithic to the late medieval period. The sites yielding antiquarian remains with their cultural assemblage are given in the table.

Village/site	*Latitude*	*Longitude*	*Cultural assemblage*
Bariara	32°17'57"	75°69'32"	Late medieval
Basa Harialan	32°16'20"	75°52'32"	Lower and Middle Palaeolithic
Bhadwan	32°18'10"	75°57'30"	Late medieval
Bod	32°17'20"	75°52'10"	Late medieval
Chhatroli	32°16'30"	75°50'30"	Lower Palaeolithic
Ghuliana	32°16'30"	75°58'30"	Two wells of nineteenth century
Ghurnu	32°17'30"	75°59'53"	Siva temple; late medieval
Jachh	32°16'30"	75°51'45"	Tank, temple, late medieval and two *chhatris*
Jounta	32°15'30"	76°0'25"	Relics of the time of Ranjit Singh of Lahore
Kamnala	32°15'45"	75°51'15"	Temple and late medieval sculptures
Kupara	32D15'35"	76°0'35"	Late medieval
Matholi	32°16'20"	75°51'15"	Lower Palaeolithic
Mowagarh (Baranda)	32°16'25"	75°47'35"	Temple and three tanks; late medieval
Nag-Da-Pali	32°17'30"	75°58'25"	Late medieval
Nagrota	32°19'0"	75°58'18"	Temple; late medieval
Saman	32°17'20"	75°59'04"	Temple; late medieval
Saprola	32°17'35"	75°59'20"	Late medieval
Trilokpur	32°13'30"	76°04'50"	Fort, *gurudwara,* palace, two temples and sculptures, early nineteenth century

20. EXPLORATION IN DISTRICT SIMLA.—In the course of exploration S. N. Kesarwani and R. N. Kaw of the North-western Circle of the Survey noticed remains of two stone temples, a good number of Brahmanical sculptures and architectural fragments of different periods ranging from *circa* ninth to the seventeenth centuries AD at village Balagin, in tehsil Theog. The notable images, now invariably placed in the sanctum of the larger temple, represent Vishnu, Lakshmi-narayana, Surya, Uma-Mahesvara, Ganesa and Mahishamardini. One of the sculptures bears an inscription in four lines on its pedestal. They also noticed remains of some Brahmanical temples, sculptures, and architectural fragments of early medieval times at Hatkoti, a late medieval temple and numerous stone sculptures ranging in dates from *circa* tenth to the eighteenth centuries at Nirth, and a medium-sized temple of late medieval period at Sarahan.

JAMMU AND KASHMIR

21. EXPLORATION IN DISTRICT BARAMULA.—With the objective of tracing the ancient routes to Kashmir, S. N. Jaiswal assisted by R. K. Jatta of the North-western Circle of the Survey explored Jhelum valley gorge from Kanispur to Uri. The remains range from Neolithic to the late medieval times. The sites yielding antiquarian remains with their cultural assemblage are tabulated below.—

Taluk	Village/site	Latitude	Longitude	Cultural assemblage
Baramula	Badamula	$34^0$10’	$74^0$18’	Temple, renovated *ziarat* of Sakhi Sarwan; Late medieval
-do-	Bunagantmula	$34^0$10’	$74^0$16’	Early historical (associated red ware of N.B.P.), Kushana, early and late medieval and *ziarat* of Fatkan Saheb (ninteenth century)
Baramula	Drangbal	$34^0$12’	$74^0$19’	Early historical, Kushana and medieval
-do-	Fatehgad	$34^0$10’	$74^0$19’	Kushana, early and late medieval
-do-	Huin	$34^0$10’	$74^0$20’	Kushana, early and late medieval and *ziarat* of Sayyad Momin Shah Rasul (*circa* nineteenth century)
-do-	Kanispur	$34^0$13’	$74^0$24’	Neolithic, early historical (red were associated with N.B.P. Ware), Kushana, early and late medieval and *ziarat* of Sayyad Bahadur Padshah (eighteenth century)
-do-	Khadanyar	$34^0$11’	$74^0$17’	Early and late medieval and *ziarat of* Sad Kassam Sahel Zilani (eighteenth century)
-do-	Kitshom	$34^0$10’	$74^0$17’	Kushana, early and late medieval
-do-	Malapur	$34^0$9’	$74^0$19’	Kushana and late medieval
-do-	Narahthal (Jalsheri)	$34^0$12’	$74^0$18’	Early and late medieval
-do-	Petha Gantmula (Bala)	$34^0$10’	$74^0$15’	Neolithic and late medieval
Baramula	Sheri Mulsama (Shir Narwao)	$34^0$11’	$74^0$18’	Early historical (associated red ware of N.B.P. Ware), early and late medieval
-do-	Singhpur	$34^0$12’	$74^0$25’	Neolithic, Kushana, early and late medieval
-do-	Wushkur	$34^0$12’	$74^0$21’	Kushana, early and late medieval
-do-	Zainpur	$34^0$11’	$74^0$16’	Kushana, early and late medieval remains of a stupa
-do-	Zandafaran	$34^0$10’	$74^0$18’	Kushana and late medieval and *ziarat* of Sayyad Zia-ud-din (*circa* nineteenth century)
-do-	Zugiyar	$34^0$10’	$74^0$18’	Kushana and ziarat of Sayyad Kamaruddin Saheb (*circa* eighteenth century)
Uri	Bagna	$34^0$10’	$74^0$07’	Late medieval

-do-	Bambyar	34^{0}09’	74^{0}12’	Early historical Kushana, Early and late medieval
-do-	Chhulan	34^{0}08’	74^{0}03’	Late medieval
-do-	Dhanni Saiydan	34^{0}08’	74^{0}05’	Early and late medieval and *ziarat* of Shah Nasir-ud-din Wali (*circa* eighteenth century)
-do-	Dowarah	34^{0}07’	74^{0}04’	Kushana, early and late medieval
-do-	Gingal	34^{0}07’	74^{0}06’	Kushana and early medieval
-do-	Ijara	34^{0}10’	74^{0}13’	Early and late medieval
-do-	Manjgiran	34^{0}11’	74^{0}15’	Kushana, early and late medieval and *ziart* of Baba Gafoor Badshah (*circa* eighteenth century)
-do-	Naganari	34^{0}11’	74^{0}14’	Early and late medieval
-do-	Naushahra	34^{0}09’	74^{0}13’	Kushana and late medieval
-do-	Naushahra (Pirniana)	34^{0}09’	74^{0}13’	Kushana
-do-	Nurkhwah	34^{0}09’	74^{0}07’	Late medieval and *ziarat* of Pir Shamshar Gazi (eighteenth century)
-do-	Pahli pura	34^{0}11’	74^{0}13’	Kushana and late medieval
-do-	Paran Pilan	34^{0}07’	74^{0}03’	Kushana, early and late medieval and fortress, *ziarat* of Zan Shah Pir (*circa* eighteenth century)
-do-	Shahkot	34^{0}09’	74^{0}11’	Kushana, early and late medieval and remains of *ziarat* (*circa* nineteenth century)
-do-	Tathamula	34^{0}09’	74^{0}10’	Kushana, early and late medieval and *ziarat* of Shah Sadkan Calander (*circa* nineteenth century)

In the course of exploration conducted in Tehsils Baramula and Pattam, G. S. Gaur of the North-western Circle of the Survey, explored the following sites.—

Site	Tehsil	Cultural assemblage
Raiten	Baramula	Burnished coarse grey and combed wares
Gopas Udar	Pattan	Burnished coarse grey, combed and gritty red wares
Kriri Chak	-do-	Burnished coarse grey and gritty red wares
Kuladur	-do-	Burnished coarse grey ware
Mukam-Udar	-do-	Burnished coarse grey ware
Taparibala	Baramula	Burnished coarse grey ware
Wanigom	-do-	Burnished coarse grey ware
Yohteng	-do-	Burnished coarse grey ware

22. EXPLORATION IN DISTRICT JAMMU.—In the course of Village-to-Village Survey conducted in Taluks Jammu and Nawan Shahr, K. G. Nauriyal of the North-western Circle of the Survey, under the guidance of S. N. Jaiswal and under the overall supervision of R. S. Bisht noticed antiquarian remains in thirty-seven villages in the valleys of the Chanab and Tawi. The remains range in time from the Lower Palaeolithic to the nineteenth century. The sites yielding antiquarian remains with their cultural assemblages are tabulated below.

Taluk	Village/Site	Latitude	Longitude	Cultural assemblage
Jammu	Bathur	32°46'	74°43'	Kushana and late medieval
-do-	Chak Haune	32°44'	74°46'58'	Late medieval
-do-	Chatta	32°40'	74°48'48'	Kushana and late medieval
-do-	Damana	32°34'12"	74°47'	Kushana and late medieval glazed ware
-do-	Durga Chak	32°45'8"	74°46'12"	Temple (late nineteenth century)
-do-	Gajansu	32°45'30"	74°42'36"	Kushana
-do-	Galwadde	32°46'7"	74°43'25"	Kushana
-do-	Garhi	32°47'30"	74°45'54"	Temple (late nineteenth century)
-do-	Ghaink Paliwal	32°49'9"	74°49'6"	Late medieval
-do-	Jhirai (Kalianpur)	32°49'38"	74°44'0"	Temple (late nineteenth century)
-do-	Kalakam	32°49'	74°47'18"	Kushana, copper coin and terracotta objects
-do-	Kalari	32°49'45"	74°48'48"	Late medieval
-do-	Kane Chak	32°49'18"	74°48'18"	Group of five temples (late nineteenth century)
-do-	Karlup	32°45'	74°44'	Temple (late nineteenth century)
-do-	Karam Uparli	32°47'25"	74°50'30"	Rectangular structure (late medieval)
-do-	Khairi	32°49'48"	74°48'6"	Lower palaeolithic
-do-	Khan Chak	32°43'48"	74°46'52"	Late medieval
-do-	Kot	32°49'50"	74°49'12"	Kushana and medieval glazed ware
-do-	Kukarhan	32°42'48"	74°42'	Late medieval
-do-	Lahauri Chak	32°43'48"	74°43'	Temple (late nineteenth century)
-do-	Malchal Brahmanan	32°45'50"	74°45'12"	Kushana and terracotta objects
-do-	Nagbani	32°46'55"	74°46'21"	Kushana and terracotta objects
-do-	Paladpur	32°41'58"	74°46'21"	Late medieval
-do-	Palaura	32°45'33"	74°51'58"	Kushana, late medieval and terracotta objects
-do-	Panjor	32°49'39"	74°13'12"	Kushana
-do-	Paroah	32°45'30"	74°45'24"	Kushana and late medieval
-do-	Patnehal	32°44'54"	74°46'	Kushana and late medieval
-do-	Phalora	32°46'55"	74°46'	Kushana
-do-	Rapor Khalka	32°43'24"	74°46'16"	Late nineteenth century
-do-	Rajpur	32°50'55"	74°43'18"	Late medieval
-do-	Rathua	32°43'24"	74°44'	Kushana, Late medieval and temple (late nineteenth century)
-do-	Saharan	32°44'12"	74°44'	Late medieval
-do-	Sohanjna	32°41'54"	74°44'32"	Temple (late nineteenth century)

Jammu	Tibba Name Shah	32^{0}44’	74^{0}44’	Kushana and late medieval
-do-	Tikri	32^{0}45’27”	74^{0}46’12”	Kushana and late medieval
Nawan Shahr	Ban-Sultan	32^{0}38’58”	74^{0}48’	Five mounds, Kushana and late medieval
-do-	Miran-Sahib	32^{0}38’26”	74^{0}49’	Temple (late nineteenth century)

G. L. Badam and Rajinder Ganjoo of the Deccan College Post-graduate and Research Institute, Pune, undertook explorations of the Upper Siwaliks of Jammu between Paramandal and Nagrota. The stratigraphy observed at these localities is similar to the one exposed in parts of Himachal Pradesh and Punjab. The three litho-units, Nagrota Formation, Khanpur Formation and Tawi Formation of the Jammu Upper Siwaliks correspond to those of Tatrot, Pinjor and Boulder Conglomerate Formations of Himachal Pradesh and Punjab.

A varied collection of vertebrate fossils from various sections around Paramandal (about 45 km north-east of Jammu) on the stream Devka was made. The fossils include *Stegolophodon* sp., *Stegodon* sp., *Elephas* sp., *Bos Bubalus* and *Hippopotamus* sp. A few fossils were found around Nagrota (about 13 km north-west of Jammu) also. This is the first important report on vertebrate fossils from the area after the work of Wadia (1924) and Pilgrim (1939).

23. EXCAVATION AT GUFKRAL, DISTRICT PULWAMA.—The Prehistory Branch of the Survey carried out excavations at Gufkral under the direction of K. D. Banerjee and A. K. Sharma assisted by. R. Batra, S. S. Gupta, K. V. Ramanrao, A. J. Nambhiraju, J. S. Dubey, P. Biswas, B. R. Rajput and S. Chatterjee. Grains were collected and studied by M. D. Kajale of the Deccan College Post-Graduate and Research Institute, Pune. The objectives of the excavation were to ascertain the cultural sequence of the site including suspected 'Aceramic Neolithic' level and to find out the nature of floral and faunal assemblage during the different periods.

The site (Lat 35°54'N; Long 75°60'E) is located on an extensive deposit of Upper Karewa, 41 km south-east of Srinagar, near Tral. At the top, the surface measures 400 m north-south and 75 m east-west. Maximum height of the mound from the road level on the western side is 35 m. On the eastern edge of the Karewa height, almost in the centre, are found a number of menhirs on the slope. None of them, however, is in its original upright position. In all, six quadrants, each measuring 4-25x4-25 m, were opened. Of these five were laid almost in the centre of the mound and the sixth was near one of the menhirs. Natural soil was reached in five. The site revealed three main periods of occupation (fig. 4).

Period I A (Aceramic Neolithic) is characterized by a total absence of pottery. It has a deposit of 35 cm to 1.10 m sealed by a continuous floor, of yellow compact clay mixed with *chunam,* running in all the trenches. Two phases of occupation could be distinctly marked by the presence of two floor levels, one on the top of the natural soil and the other above a deposit of nearly 30-35-cm (pl. VIII). Settlement pattern consists of large and small dwelling pits cut into loessic deposits, circular or oval on plan with narrow mouth and wide bottom. They vary in diameter from 3.80 m to 1.50 m at the top. Large dwelling pits generally belong to the earlier phase and are only 20 to 30 cm deep. These pits are surrounded by storage pits and hearths. A number of post-holes are noticed around the pits and the hearths to support the superstructure

of grass and reed. Recovery of mud chunks with reed impressions may indicate that the bases of superstructures appear to have been plastered with mud to give strength and prevent entry of water and snow from sides. In the earlier phase the floors of the dwelling pits and storage pits, all cut into the loessic deposit (top of natural soil) with their working levels in a wide area, are plastered with red ochre paste. Some dwelling pits cut in the earlier phase were subsequently enlarged and used in the later phase also as indicated by the successive deposits inside these pits. In the later phase two-chambered dwelling pits are also available (pl. IX A). Hearths of the earlier phase I are rectangular in shape, whereas in the later phase, phase II, both circular and rectangular hearths made of burnt clay are available. One of the circular hearths has its floor and sides plastered with mud. This circular hearth is 93 cm in diameter (outer) and 30 cm deep. It has post-holes on its outer periphery. No hearth or fire-place has been found within the dwelling pits.

Among the artifacts of this period are polished stone celts, both finished and unfinished (pl. X A), stone points, with one or both the ends sharp. These are made of Himalayan Trap. There are also one broken unfinished ring stone, pounders and querns, all made on sandstone. A large quern with a depression on the working surface and showing red ochre paste sticking to it was recovered from the floor (treated with red ochre) near one of the dwelling pits.

Twenty-seven bone/horn tools (pl. XI), polished throughout the body or only at the working tips were recovered. They were shaped out of long bones, splinters and horns. Most of these are points and arrowheads. Besides these, two awls, some piercers and scrapers have also been recovered. Of special mention is a polished bone needle with damaged eye. In majority of the tools, tips have been charred to add to the existing strength of the working ends. Bone tools are mostly made from the green bones; bones of sheep, goat, cervus and ibex having been generally preferred. Arrowheads are tiny tools comparable in size to the microliths, with only their tips charred and polished. Among the ornaments recovered are one cylindrical highly polished spacer bead and two steatite beads, one cylindrical and another barrel-shaped. A broken terracotta marble was also found (pl. X B).

The animals represented in this period are wild sheep *(Ovis orientalis),* wild goat *(Capra aegagrus)* wild cattle *(Bos namadicus),* red deer *(Cervus elephus),* wolf *(Cards lupus),* Himalayan ibex *(Capra Ibex)* and beer *(Ursus).* Sheep *(Ovis aries)* and goat *(Capra hircus)* were the only animals that were domesticated and formed five and three per cent of the total assemblage respectively. With the exception of *Cards lupus,* all the animals hunted were herbivorous. *Ovis, Capra, Bos* and *Cervus* formed the largest percentage of animals hunted, *Ovis* dominating over all. Specimens indicate that cattle and goat were large well-built animals, whereas sheep was of a smaller size (pl. XII A). The animal remains amply demonstrate that in the Aceramic Neolithic Period people were predominantly dependant on wild game. Domestication of a selected variety was just being introduced.

Six-row barley (hulled) *(Hordeum vulgare* Linn), wheat *(Triticum* sp.), lentil *(Lens esculenta* Moonch) are the cereal grains recovered from this period by flotation technique. Apart from these a weedy plant *(Lithospermum arvense),* which normally grows in cultivated fields, was also recovered.

Period I A is followed by Neolithic Period I B, without any break. This period is represented by nearly 40 cm thick deposit and yielded a large quantity of charcoal. The earliest Radiocarbon date for the period is 2030 BC (BS-359). Handmade Neolithic pottery made its appearance in this period (fig. 5). Overwhelming percentage is of grey ware, sherds of rough dull red ware being few. The shapes represented are big jars, bowls and basins. The decorations include mat-impressed bases, pinched designs on the neck region and reed impression. Pottery is generally not oxidized fully.

Settlement pattern of this period is indicated by the presence of a 5-to 7-cm thick floor made of yellow compact clay mixed with *chunam* running throughout in almost all the trenches.

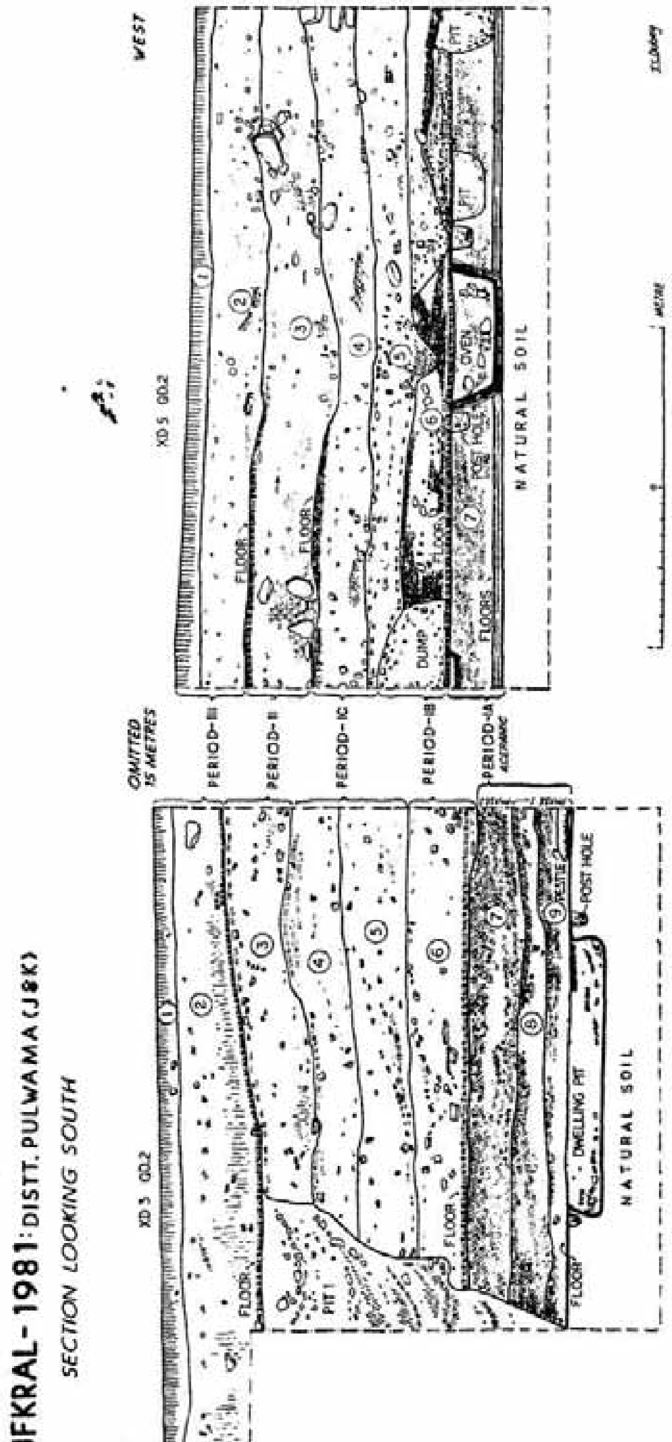

GUFKRAL-1981: DISTT. PULWAMA (J&K)
SECTION LOOKING SOUTH
EAST
WEST
XD 5 QQ 2
OMITTED 15 METRES
PERIOD-III
PERIOD-II
PERIOD-IC
PERIOD-IB
PERIOD-IA
FLOOR
PIT 1
DUMP
OVEN
POST HOLE
FLOORS
DWELLING PIT
NATURAL SOIL
METRE

FIG. 4

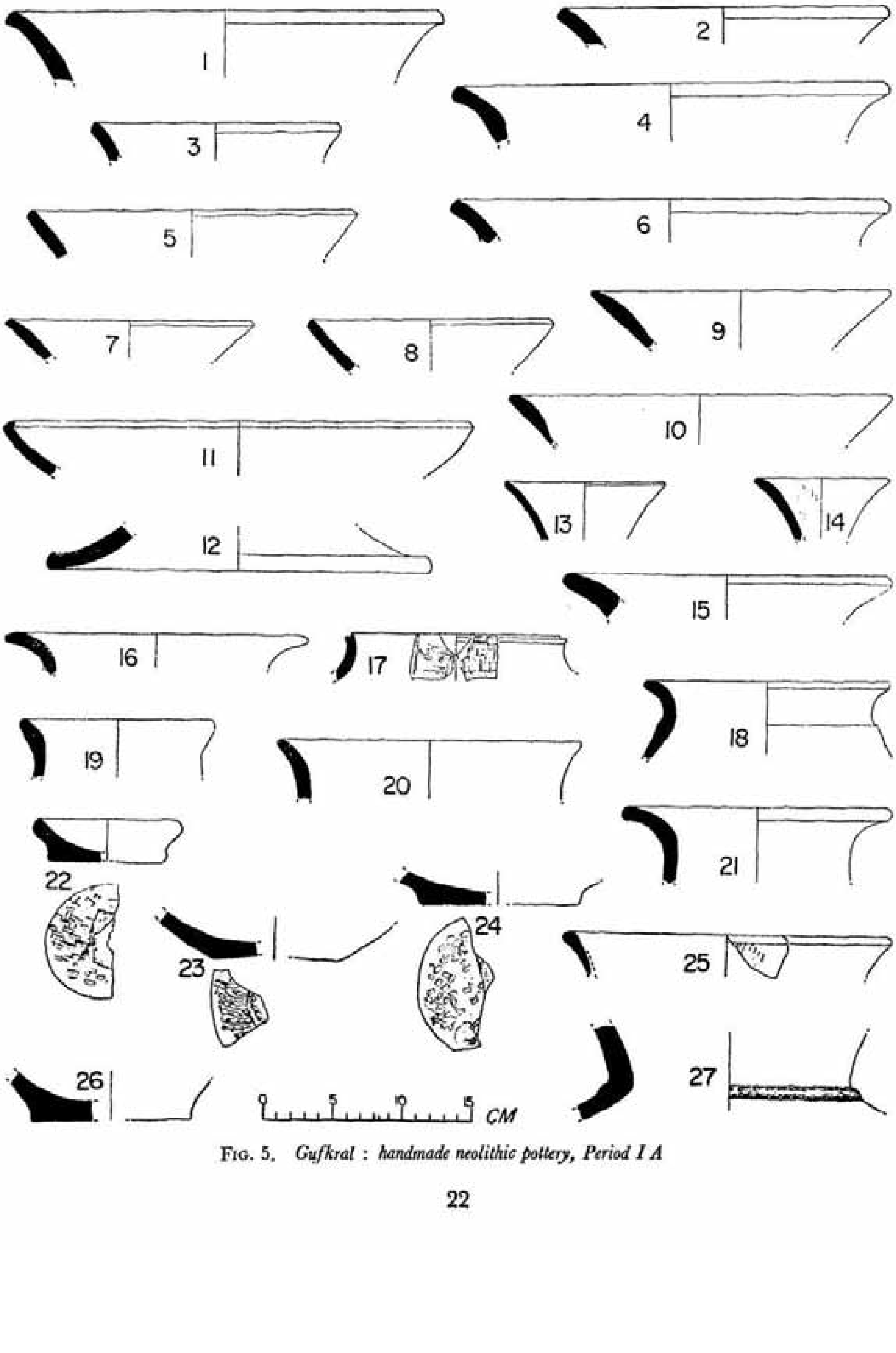


FIG. 5. *Gufkral : handmade neolithic pottery, Period I A*

At some places this floor was repaired at least 5 to 6 times. The most important building activity of this period is the construction of mud and rubble wall (pl. IX B). A compact mud (mixed with *chunam)* wall-like structure 70-cm uniformly wide throughout, is also encountered. The real significance of this structure will be clear only after it is fully exposed. Total disappearance of dwelling pits from this period shows that the settlement pattern had completely changed. From one of the trenches a huge quantity of charcoal and charred wood pieces were recovered, suggesting extensive burning. The artifacts of the period include one stone point, one broken ring stone and nineteen bone tools, mostly well-polished points, two piercers-cum-scrapers shaped out of splinters and one spatula.

The period was marked by sudden spurt in domestication of animals like sheep, goat and cattle. Sheep and goat still dominated the scene with the size of goat getting reduced. Wild sheep, goat and cattle continued to be hunted but in a far lesser percentage. The percentage of dog-bones increased with marked reduction in the percentage of bones of wolf. The bones of short-horned cattle were available. Presence of bones of red deer, ibex and bear indicate that hunting was still the main source of food. Many of these pieces bear sharp cut-marks. Bones of domestic fowl *(Gallus)* have also been recovered. Apart from all the grains of Period I A continuing, common pea *(Pisum arvense* Linn) was also found.

Period I C, the mature phase of the Neolithic Period, is represented by a 70-80 m thick habitational deposit and is sealed by a thick whitish floor throughout. It is characterized by the presence of a large number of refuse pits and dumps. Upper levels of this period have been dated to 1620 to 1300 BG by Radiocarbon method (BS-371 and 360).

Pottery consists of grey ware, burnished grey ware, rough thick dull-red ware, burnished black ware and wheel-turned burnished black ware. Few sherds of red gritty ware are also present. All the shapes of Period IB continued and long-necked jar was introduced. Dish-on-stand with triangular perforated designs on the stem region on burnished grey ware also makes appearance (fig. 6). Decorations include mat and cord impressed bases; reed impression to create roughened surface on grey and dull-red wares; pinched designs on the neck region and incised oblique designs on the neck region in dull-red ware (pl. XIII); and knobbed designs on the neck region of the wheel-made burnished black ware.

Stone objects are scarce. Only one unfinished stone celt has been found. Stone points which had almost disappeared in Period I B make their appearance again in good number (fourteen). Other stone objects include querns, pounders and bells. Double-holed harvesters (pl. XIV A), one having incised decoration on one side and spindle whorls with large holes (pl. XII B) in stone and terracotta are the important objects recovered from this period. Other cultural assemblages include terracotta bangles, potsherds with graffiti marks (pl. X B) and terracottas with relief design. Of special significance is the recovery of a copper hair-pin with flattened coiled head from upper levels of this period (pl. X B), similar to one found at Chanhudaro. The period has yielded the largest number (forty-one) of bone tools (pl. XV), most of which were well-polished points. Tips are generally charred and sharp, particularly in case of micro tools like arrowheads. Few awls, a spatula, a harpoon and a bone object with four oblique incised grooves are the other finds.

Animals represented in this Period were sheep *(Ovis aries),* goat *(Capra hircus),* cattle *(Bos indicus),* dog *(Canis familiaris)* and pig *(Sus scrofa),* all of domesticated variety. There was considerable reduction in the size of goat and cattle. Bones offish, hare *(Lepus),* hedge-dog, rodents and beaver were also found. All the grains of Period I B continued in this period.

Complete domestication of animals and advent of harvesters and spindle-whorls indicate that by this time the Neolithic people at Gufkral had adopted a well-settled life, in which practising of agriculture, cattle breeding and herding and weaving of woollen cloth had been in vogue. Hunting was now restricted to red deer and ibex and, that too, on a limited scale,

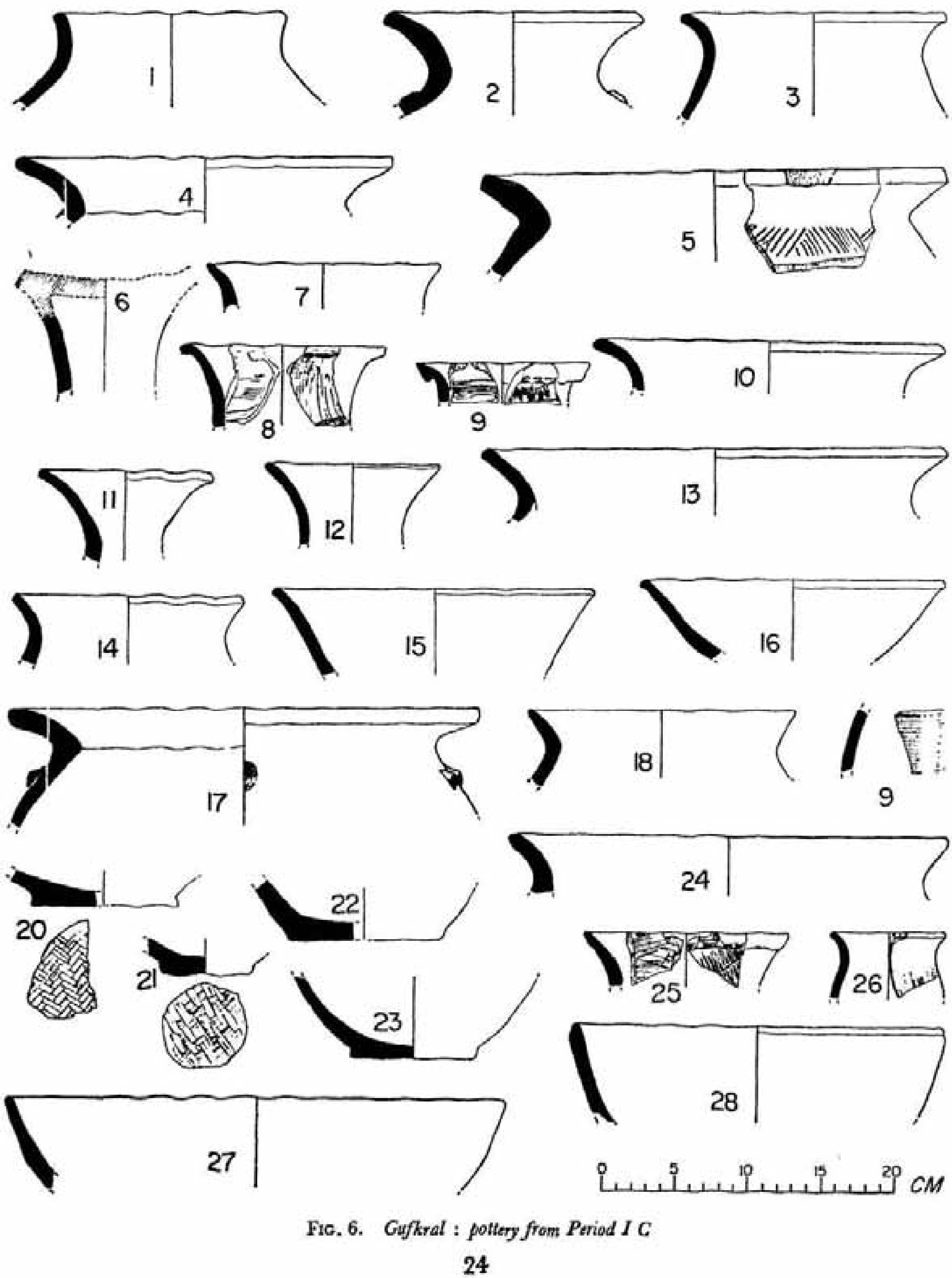


FIG. 6. *Gufkral : pottery from Period I C*

as the percentage of these animals reduced considerably in the assemblage. Contacts with the outside world had also started.

Period II (Megalithic) is associated with the arrival of menhirs on the site and represented by nearly 50-60-cm thick habitational deposit. In one of the quadrants, near a fallen menhir, a pit cut into layer 3 containing large quantity of packing material comprising broken pebbles, shows that the menhirs did not have very deep foundation-pits. The Period is marked by the presence of floor of nearly 10 cm thickness, running throughout, with few breaks due to considerable digging for pits, many of which are refuse pits, going down to the natural soil. From these refuse pits large quantity of pottery and animal bones were recovered.

Burnished grey ware, gritty red ware and thick dull-red ware continue from the previous Period with the higher percentage of thick dull-red ware and wheel-made ware. Shapes include jars with shapeless rims, long-necked jars, bowls, basins, dish-on-stand, medium-sized globular jars and vessels with channelled spout. Pinched designs on the neck region, incised designs and combed surface obtained by brushing with straw and reed, are available. Large ring-stones, both finished and unfinished, are found in good number (pl. X A). Stone points have almost disappeared. Other artifacts include a copper point, a wooden bead (pl. XB), pestles, spindle-whorls with medium-sized holes and miniature pot (pl. XII B). Only twenty bone tools have been recovered. New innovations were some.handles, shaped mostly from tibia of sheep/goat and bone marrow sockets. A fine cobbler's awl is a noteworthy find (pl. XIV B). All the grains of earlier Periods continued. Rice *(Oryza sativa* Linn) and millet *(Eleusive coracana)* were introduced towards the end of this Period. Animals represented were cattle, sheep, goat, dog, pig, ibex and fowl. It appears that hunting had almost come to a close, for amongst bones of wild animals only those of ibex were recovered.

Period III represents the historical period. A thick compact floor made of whitish clay runs almost throughout, sealing the Megalithic Period. The limited excavation has not yielded any structures except floors of this Period. Handmade pottery continues, but wheelmade thin bright-red ware is preponderant. The pottery includes jars, bowls, miniature pots (pl. XII B), lamps, vases, dishes, knobbed lids, lid-cum-bowls, double-rimmed pots and cup-on-stand. Few sherds of black-painted red ware with stamped design have also been collected alongwith stone bowls. The artifacts include crude bone points, one polished bone handle, ring-stones, pounders, a few stone points and a huge terracotta circular disc. Iron makes its appearance in this Period. All the grains of the previous Period continued with a definite evidence of rice *(Oryza sativa* Linn) from the lower levels of this Period. Animal bones recovered belong to cattle, sheep, goat, dog, pig, felis (cat), fowl and rodents.

KARNATAKA

24. EXCAVATION AT HAMPI, DISTRICT BELLARY.—In continuation of last year's *(1980-81,* pp. 26-27) work L. K. Srinivasan assisted by Lai Chand Singh, Siva Sharma, C. L. N. Sastri and G. B. Patil of the Mid-southern Circle of the Survey and Nagaraja Rao and his team of the Department of Archaeology and Museums, Government of Karnataka, resumed the excavation.

During this season the Survey continued to excavate in the area between King's Audience Hall and Mahanavami-dibba and the Mint Area. The three structural phases—the first two characterized by dressed masonry and the third by rubble masonry plastered by thick coat of lime—noticed and reported earlier, were further confirmed.

Particularly noteworthy among the structures exposed is the basement of a large rectangular pillared hall, measuring 40 m (east-west) and 32-35 m (north-south), located towards south-west of the underground chamber, west of the Mahanavami-dibba. This pillared hall, ascribable to the second structural phase which had been partially excavated in the last

season, was fully exposed; on its southern side were unearthed two separate flight of steps corresponding to the two flight of steps of the north side exposed in the last season. In the third structural phase this large pillared hall was divided into two portions by a central cross wall running east-west; each portion is further divided into four big rooms. The lime floor of this third structural phase covers the stone pillar-bases of the earlier phase.

A series of rectangular pillared halls with plain ornamental plinths and pillar-bases separated by passages in between were also exposed towards the east of King's Audience Hall; some of these were found aligned along the northern wall of the citadel enclosing the Mahanavami-dibba. Three of them, one measuring 21 m (north-south) by 16.50 m (east-west) with plain pillar-bases and sockets provided at regular interval of 2.5 m, the second measuring 16.30 m (east-west) and 6.82 m (north-south) with narrow passage separating it from the first and the third measuring 39.70 m (east-west) and 19.10 m (north-south) are noteworthy. The surviving plinth of this third pillared hall was seen overrun by a rubble masonry wall of the third structural phase and roughly-dressed masonry hall of probably a later period. Towards the west of the above pillared halls was exposed a covered masonry drain which cuts through the citadel wall. At its widest point this drain measures 70 cm in depth and 50 cm in width. To the east of the entrance of King's Audience Hall was exposed a basement of another pillared hall, measuring 27.50 m (east-west) 6.35 m (north-south), along with a side chamber. The most interesting discovery in this area are the two concealed drains running at different levels and interconnecting the pillared halls. These drains are connected with the main drain referred to above.

The earlier excavation in the Mint Area, towards the north and west of the structure, called Rangmahal, which had revealed the extant foundations of a huge structure in the form of a peristylar enclosure was further extended and the other two sides (i.e., the western and the southern) were completely exposed. The rooms of the peristylar structure varied in size from 5.35 m to 11.40 m in length with a uniform width of 2.75 m. The south-eastern corner of this peristylar enclosure was found more damaged than the other portions. Here the foundation-wall is provided with two offsets, as could be seen in one of the rooms. Similar feature was also observed in the south-western corner.

At a depth of 3.5 m a drain, running diagonally across one of the rooms in the southern arm of the cloistered enclosure close to the STR 2 (excavated by the Department of Archaeology and Museums, Government of Karnataka), was exposed. This drain was covered with rough stone slabs and at places with broken architectural members. In the north-eastern corner was exposed another covered drain which is in a badly damaged condition. Another interesting discovery in the Mint Area is a drain lined with earthen pipes laid in a north-south orientation.

Running parallel to the western wall of the citadel outside the peristylar enclosure was a set of rooms. Towards the southern end of these rooms there was a drain hewn out of large stone blocks. A stepped-well and a rectangular pillared hall with four rows of pillars are other structures exposed in the Mint Area. Among other noteworthy finds in this area are two soak-pits, one of which is located towards the south-eastern corner outside the peristylar enclosure.

Among the antiquities a number of copper coins, a copper ring, beads of terracotta and semi-precious stones, terracotta balls and bangles and a sculptured relief in the Hoyasala style are noteworthy.

The Department of Archaeology and Museums, Government of Karnataka, continued excavation in the Mint enclosure. A residential building raised over a moulded stone platform was exposed to the south of Rangasala. It consists of a courtyard, front hall, central hall and rooms on three sides. The walls and floors are plastered with lime.

25. EXPLORATION IN DISTRICT GULBARGA.—In the course of explorations conducted in the Hunsgi valley (lying in the Shorapur Taluk) K. Paddayya of the Deccan College Post-graduate

and Research Institute, Pune, discovered Stone Age sites. The sites belonging to the Acheulian culture were found within the revenue limits of Benkanhalli (one locality), Devapur (one locality), Hebbal Buzurg (two localities), Kaldevanhalli (one locality) and Wajal (one locality) villages. The locality at Benkanhalli is situated on the right bank of the Hunsgi stream; the rest are located away from the stream courses, some lying in the foothill area of the limestone plateaux enclosing the valley. All these localities are primary or occupation sites where the cultural material is preserved in its original context. The occupation levels vary from 10 to 25 cm in thickness. Stone tools in fresh condition and blocks of raw material are found in a matrix of whitish/brownish deposit representing weathered rock. The deposits directly overlie bed-rock and are in turn capped by black soil; the latter is 1 to 2 m in thickness and is brought under cultivation at some places. The artefacts are made of limestone, with dolerite, granite and other rocks serving as subsidiary raw materials. Cleavers and handaxes of various shapes, picks, knives, polyhedrons, and chopping tools are the principal types represented in the assemblages. Interestingly enough, the localities at Kaldevanhalli, Hebbal Buzurg and Wajal have also yielded a small quantity of fossilized animal bones along with stone artefacts. These pieces belong to the *Bos* and deer/stag species, and will be of immense help in understanding prehistoric subsistence patterns. Apart from these regular sites, isolated finds of Acheulian artefacts have been recorded at several spots.

Half-a-dozen Mesolithic localities were discovered at Chennur, Hebbal Buzurg and Wajal. Whitish chert forms the raw material. The tools include retouched blades, backed blades and geometric types such as lunates and triangles. From their locations it is clear that all these spots are occupation sites. Also, two sites belonging to the southern Neolithic culture were found near Benkanhalli and Wajal. These yielded red ware, animal bones and artefacts of the pecked and ground stone and blade tool traditions.

26. EXPLORATION IN DISTRICT SOUTH KANARA.—In continuation of last year's work *(1980-81,* p. 31) P. Rajendran, Post-Doctoral Fellow, Department of Archaeology, Deccan College Post-graduate and Research Institute, Pune, carried out exploration in the Netravati river basin. A few Palaeolithic artefacts have been discovered at Uppinanagadi; they are mostly choppers, made on quartz pebbles from the river bed. The site is situated about 51 km inland from the sea at a height of 30-m MSL. Palaeolithic artifacts have been discovered for the first time from the coastal Karnataka.

KERALA

27. EXPLORATION IN DISTRICT IDUKKI.—R. Namboodiri of the Southern Circle of the Survey carried out intensive exploration in the thickly-forested hill area of the Western Ghats to locate antiquarian remains. He noticed two disturbed dolmens and one disturbed dolmenoid cist, 10 km south-west of Idukki dam, one multi-chambered dolmen at Vellappara, near Idukki dam, two granite menhirs and one dolmenoid cist at Meppara village and ten menhirs in one alignment at Mookanpara.

28. EXPLORATION IN DISTRICT QUILON.—Exploration carried out in the spurs of Chendurni hills at Termalai by P. Rajendran, Post-Doctoral Fellow, Department of Archaeology, Deccan College Post-graduate and Research Institute, Pune, brought to light two Mesolithic sites in the region. One of them is a cave-site situated about 152-m above MSL at the foot of the Chendurni hill. It has yielded various types of Mesolithic artifacts, besides a few Upper Palaeolithic blades. Rock engravings of the Mesolithic period have also been noticed on the exterior of the cave. The cave is formed by a very large gneiss monolith which had come down from the higher levels.

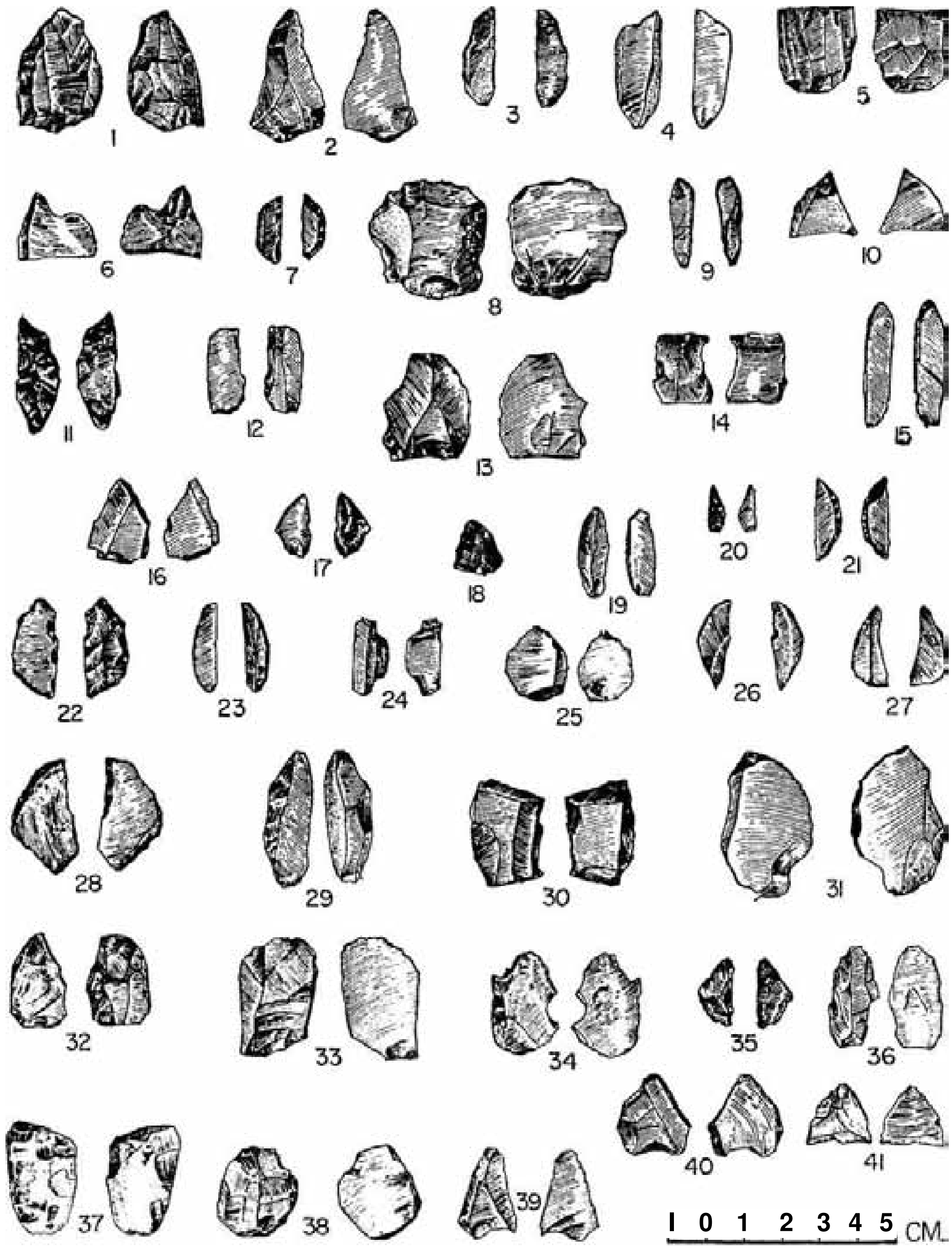


FIG. 7. *Bastar* : *Late Stone Age tools*

An open-air Mesolithic site has been located on the right bank of the Tirthankarai Ar which is one of the major tributaries of the Achankovil Ar. The site is situated about 70 m above MSL, and here the artifacts are found on the surface as well as within the lateritic alluvium. At both the sites the Mesolithic artifacts are made exclusively on quartz which is locally available in the form of water-worn pebbles (pl. XVII A).

MADHYA PRADESH

29. EXPLORATION IN DISTRICT BASTAR.—In continuation of previous work *(1980-81,* pp. 31-32) further exploration was undertaken around Keskal by A. K. Sharma assisted by A. S. Stevenson and R. K. Dwivedi under the guidance of K. D. Banerjee of the Prehistory Branch of the Survey. Along the Gourbahar, Boarding, Boroda, Narangi and other minor streams, mostly tributaries of the Indravati, a number of Late Stone Age, Megalithic and historical sites were discovered. While Banskot (20°00'N, 81°51'E), Barhapara (20°02' N; 81°42' E), Borgaon (19°50' N; 81°35' E), Jakri (19°45' N; 81°30' E) and Tendubhata (20°00' N; 81°30' E) yielded microliths, at Dugalvengal (19°95' N; 81°15' E), Godma (19°95'N;81°30'E) and Mothe (19°50' N; 81°30' E) microliths, cairn circles and menhirs were located. Apart from microliths, cairn circles with portholes were noticed at Parond (20°02' N; 81°47' E).

The area is generally covered with a thick deposit of laterite lying over the Archaean bed-rock. Laterite is superimposed by lateritic clay. At Tendubhata, the lateritic clay is further covered by nearly 20 cm thick deposit of detrital laterite brought from higher levels. Nearly 15 cm thick vein of quartz runs throughout, about 2 m below the surface, embedded in the laterite. All the sites are located on elevated ground around outcrops of huge rocks having flat surface, providing enough space to rest and to manufacture tools. AH the Late Stone Age sites are factory sites, for, apart from finished tools, cores, waste flakes and lumps of raw material are found in huge quantity, except at Banskot, where the raw material was brought from elsewhere. The raw material used at all the sites are quartz, crystal and chert; quartz accounts for nearly 70 percent of the raw material, whereas chert was sparingly used.

The tool-types (fig. 7) include blades, retouched blades, blunted-back blades and points. There are also a lesser number of notched flakes and borers. Geometric tools such as triangles and trapezes are very few, but lunates are found in considerably good number.

Apart from these, Neolithic celts, one each, was also recovered from Mothe and Borai.

A number of loose sculptures are also located at different places. At Baskot in a mango-grove there is a sculpture of a village deity accompanied by attendants. At Parond a piece of broken *amalaka* and a hero-stone depicting two large human figures and a dwarf male in relief were noticed. At Alur (19°50' N; 81°30' E), to the north of the village near the foot of a high hill and in the jungle, four hero-stones and an image of Ganesa, all of sandstone, were found.

30. EXCAVATION AT KHAJURAHO, DISTRICT CHHATARPUR.—In continuation of last year's work *(1980-81,* pp. 32), the Central Circle of the Survey under the guidance of D. K. Sinha and S. A. Sali, M. U. Rao and A. K. Pandey took up the excavation of the mound, mainly to assess the nature of such mounds around Khajuraho. This year's work has brought to light a brick structural complex. It is built over an uneven outcrop of granite bed-rock, a common feature seen in the case of many temples of Khajuraho. The uneven surface is levelled up with stone flakes, rubble and clay. Over this levelled sole a brick *jagati* has been raised up to a height of about one metre. Over this common *jagati* a number of shrines had been erected. Present excavation has revealed three such shrines, each with an *adhisthana,* 2 m high; while two are *tri-ratha* on plan, the third is apsidal on plan. All the three shrines are facing the east. The first shrine, with its *adhisthana* intact, shows remnants of brick walls of the superstructure.

The structure also gives an idea of a flight of steps leading to the sanctum from the *jagati.* The sanctum has a stump embedded in the centre which looks like a rectangular *yoni-pitha* on plan, and rises slightly above the sanctum floor. This stump is composed of soft bluish-black clay with rubble embedded in it. It is 1.4 m square with a projection of 1 X O.60 m towards east.

The second stump has been partly exposed down to the bottom. It is raised to a height of 2.5 m from the base of the *adhisthana* and is encased in the brick *adhisthana.* The superstructure of the shrine is completely lost.

The third structure retains only a couple of courses of bricks of its northern arm showing the apsidal nature of its plan. The other portions of the *adhisthana* are completely lost, most probably due to brick-robbing. Another brick structure abutting the eastern side of the three shrines and running north-south may indicate a sort of passage between these three shrines. Yet another wall-like brick structure is found slightly away from the *jagati* on its western side, the nature of which is yet to be ascertained.

A good number of fragments of sandstone sculptures (mostly of small size) and architectural members have been recovered. The architectural fragments include lintels, pilasters, door-jambs and door-sills. They are variously sculptured and decorated with the figures of musicians, dancers, *dvara-palas,* Ganga and Yamuna, and geometric decorative designs. On stylistic ground, these pieces are assignable to the Chandella period.

This year's excavation gives an indication of three phases of activity, the first phase of which may be assigned to the early Chandella, if not slightly pre-Chandella period.

31. EXPLORATION IN DISTRICT DHAR.—S. N. Rajaguru, P. K. Thomas and S. Mishra of Deccan College Post-graduate and Research Institute, Pune, explored a stretch of the Narmada river around Dharampuri (Lat 22°8' N; Long 75°20' E). During the exploration a chalcolithic mound near Kathora village, opposite Dharampuri, on the left bank of the Narmada was discovered. The habitation debris rests on a 20 m high terrace on the Narmada. The mound is 1 m thick and fairly extensive. It is partly disturbed by modern cultivation. A large number of painted potsherds, microliths, saddle-querns and animal bones of *Bos indicus, Sus scrafa, Capra/Ovis,* etc. were collected from the disturbed part of the mound. The nature of the painted pottery and other antiquities suggest that the site belongs to the Malwa culture.

Detailed study of the alluvial deposits has shown that there are three distinct lithological units present in the area. Litho-unit I, the basal-most unit, is represented by a 1-5 m bouldery pebbly gravel interlayering with a heavily-kankarized sandy silt exposed in the modern bed on the Narmada. Litho-unit II disconformably caps Litho-unit I and consists of about 10 m strongly-kankarized brownish silt with lenticular patches of well-cemented pebbly gravel. Litho-unit III disconformably overlies Litho-unit II and consists of yellow-brown moderately-kankarized silty sand with the conspicuous presence of a lenticular shell-rich bed occurring just at the contact of the disconformity between units II and III. These shells have been dated to 25,160±850 BP (B.S. 286) by the C_{14} method. A few semi-mineralized bones *of Equus* and *Bos* sps. were discovered *in situ* in sandy silt capping the shell bed. The upper part of this litho-unit forms a terrace surface at a height of 20-25 m above the present river bed. On the right bank there is a well-developed erosional terrace cut into this unit at the height of 12.15 m above the present river level. This erosional surface is littered with a large number of Epi-Palaeolithic tools made on chalcedony. On the left bank there is a loosely-cemented bouldery gravel which rests on and against unit III at a height of 12-15 m above the present river.

The animal fossils mentioned above are not older than 30,000 years and are earlier than the Epi-Palaeolithic tools. On the basis of stratigraphical position and the fluorine content (0-3%) these fossils are dated to the terminal Pleistocene {*circa* 20,000-10,000). These fossils are the first to be reported from this part of the Narmada valley, west of the fossil-rich zone of the Narmada between Jabalpur and Hoshangabad.

32. EXPLORATION IN DISTRICT GWALIOR.—S. A. Sali of the Central Circle of the Survey, assisted by A. K. Pande, discovered a Stone Age industry of an unspecialized type from an alluvio-colluvial gravel, 1-50 m thick, sandwiched between the deposits of silt, exposed in a cliff-section on the right bank of a stream known as Sonrekha (Svarnarekha) at a locality called Hanuman Bandh in the village Virpur, near Gwalior. The components of the gravel are mainly angular and sub-angular chips of jaspery material which is available in the hills nearby.

The assemblage of tools chiefly consists of long or elongated nodules of jaspery material with wedge-shaped section, the natural edge of which has been retouched to form a working edge, and except this, there are no signs of working on these specimens. The collection also includes a couple of scrapers made on flakes of jasper. This industry, which is a class by itself, is very akin to that obtained on the Morar Nala near Gwalior *(1972-73,* p. 17; pl. XXIV A), which has been ascribed by its discoverers to the Upper Palaeolithic Period. However, it appears premature to assign a period to this industry without studying in detail its stratigraphic position in relation to other Stone Age industries and the local environmental factors responsible for production of such an unspecialized tool-kit by the man around Gwalior.

33. EXPLORATION IN DISTRICT MORENA.—During the course of exploration S. A. Sali and K. P. S. Bhadoria of the Central Circle of the Survey discovered late Harappan sites at Sihoniya (three sites), Khudai (two sites) and Basaiya (one site) on the left bank of the river Asan, a tributary of the river Chambal. The sites have suffered heavy erosion and only stray potsherds of the late Harappan sturdy and thick red ware of fine fabric with such types as dish-on-stand, vase with disc base, etc., were found on the surface of the river silt; the habitation deposit having been eroded completely. The surface of the potsherds has been very much worn, leaving only tiny patches of deep red slip. The weathering of the potsherds seems to be the result of abrasion with the wind-blown silt particles and also due to ploughing of the sites which are under cultivation.

At Itora, at present a deserted village on the left bank of the same river, was discovered one ancient site which yielded course red pottery, a large number of fragmentary bone tools and animal bones, a couple of fragments of human (thigh) bones, microliths, fresh-water shells, stone rubbers and a stone disc. The dominant type in the collected red pottery is a vase with an oval-collared rim. The fresh water shells were chiefly found along the periphery of the site embedded in the shallow extant occupational deposit, about 20 to 30 cm thick, resting upon the massive deposit of light-reddish silt. At present the river Asan is about 1 km away from the site. An interesting aspect of the site was that numerous small stone chips and nodules were found lying within the limits of the site, measuring 100 X 100 m, beyond which there was a total absence of stone in the alluvial plain and also in the river bed, the nearest source of the rock being at Kutwar, about 10 km upstream. The assemblage of the cultural material as a whole betrays Neolithic character.

In one of the rain-gullies, about 100 m away from the left bank of the river Asan and 1 km downstream of the deserted village Itora, one fragment of fossil animal-tooth was recovered from the deposit of kankary-sandy fine gravel sandwiched between light-brown silt and yellow silt.

Examination of the alluvial deposits on the right bank of the river Chambal at Gurha showed, in the deep rain-gullies, a succession of light reddish-brown silt with fissures above the ground level, current-bedded sandy fine gravel and yellowish silt. It was also observed that the uppermost yellowish silt intercalated by lenticular sandy patches inclined towards the opposite direction of the river bank. The exposed deposits ranged in thickness from 20 to 30 m.

Geomorphological study of the explored area of the river Asan, Kunwari and Chambal suggested that they were rejuvenated during the early Holocene period and consequently have cut their channels through the previously-deposited sediments. Abandoned meanders, such as

at Tutwas on the river Kunwari and elsewhere, also deserve mention. The alluvium in one river valley has merged with the other one near by, and as a result the area, east of the town Morena between the Asan on the south and the Chambal on the north, has assumed the form of one continuous vast alluvial plain. The sediments in this alluvial plain have been very badly dissected due to erosion, and deep, long and broad rain-gullies have been formed in a fairly broad area on either bank of all the three rivers. An idea about the immense thickness of the alluvium in the valley of the river Asan could be had at Sihoniya, where no bed-rock was encountered in the course of boring of a well in the field owned by jaisingh Parihar even at a depth of 66 m below the surface. Rock was, however, found exposed in the bed of this river at Kutwar, about 30 km upstream of Sihoniya. Heavy erosion of the banks of these rivers has forced many settlements, which at one time were located right on the banks of the rivers, to shift 3 to 5 km away. This is also the main reason as to why there is an absence of an ancient site with well-preserved occupational deposit in the explored area.

Stabilized sand-dunes were observed in the alluvial plain between the Chambal on the north and Kunwari on the south around the town Ambah, the headquarters of a tahsil of the same name. The appearance of the material in the sand-dunes is like that of a loessic silt; laboratory study of the soil samples alone can determine its true nature.

In continuation of last year's work *(1980-81,* pp. 33-35) Krishnapal Singh Bhadoria of the Central Circle of the Survey explored 60 villages in the district in the course of the Village-to-Village Survey. The sites where antiquarian remains were noticed are listed below.

Tahsil	*Village/site*	*Antiquarian remains*
Amha	Sihoniya	Chalcolithic pottery (late Harappan)
Jora	Ata	Historical pottery
-do-	Bagchini	Historical pottery, medieval fragmentary Brahmanical sculptures and a *sati* pillar
-do-	Baroli	Medieval fragmentary Brahmanical sculptures and a *sati* pillar
-do-	Bawri	Medieval fragmentary sculptures and a *baoli*
-do-	Diigaon	Medieval fragmentary Brahmanical and Jaina sculptures and architectural fragments
-do-	Devri	Medieval fragmentary Brahmanical and Jaina sculptures and architectural fragments
-do-	Guletha	Mound with chalcolithic pottery, P.G.W. and historical pottery, medieval fragmentary Brahmanical sculptures
-do-	Mai	Medieval fragmentary Brahmanical and Jaina sculptures and a memorial pillar
-do-	Paytha	Medieval fragmentary Brahmanical and Jaina sculptures
Jora	Samantukhera	Mounds with chalcolithic pottery and black-and-red ware
-do-	Sehrana	Mound with historical pottery and fragmentary Brahmanical sculptures
-do-	Susani	Mound with chalcolithic pottery (Kayatha ware?) and medieval fragmentary Brahmanical sculptures

Tahsil	*Village/site*	*Antiquarian remains*
Jora	Umedgarhbansi	Medieval fragmentary Brahmanical sculptures
Morena	Ardoni	Medieval fragmentary Brahmanical sculptures, temple remains and architectural fragments and a *sati-pillar*
-do-	Bargaon	Medieval fragmentary Brahmanical sculptures and architectural fragments
-do-	Bhainsora	Medieval temple and fragmentary Brahmanical sculptures and' architectural fragments and a *sati-pillar*
-do-	Ghirghan	Medieval fragmentary Brahmanical and Jaina sculptures and architectural fragments
-do-	Jora	Medieval fragmentary Brahmanical sculptures
-do-	Mudela	Medieval temple and fragmentary Brahmanical sculptures and architectural fragments
-do-	Shirmati	Medieval fragmentary Brahmanical sculptures and architectural fragments and a .raft-pillar

Exploration work in the district was taken up along the banks of the rivers Asan and Kunwari, which has brought to light a few sites yielding Kayatha ware and late Harappan ware.

34. EXCAVATION AT GILAULIKHERA, DISTRICT MORENA.—The exploration of the mound at Gilaulikhera (Lat 26°37' N; Long 78°5' E) yielded chocolate-slipped ware (akin to Kayatha ware), black-and-red ware, P.G.W. and N.B.P. Wares. With a view to determining the sequence of culture at the site a small-scale excavation was carried out under the direction of R. K. Sharma assisted by Rahman AH, M. C. Srivastava, B. S. Vyas, H. R. Pandey, Sudhakar Mishra, Shivakant Dwivedi and others of Prachya Niketan Centre of Advanced Studies in Indology and Museology, Bhopal, in collaboration with the Department of Archaeology and Museums, Government of Madhya Pradesh, represented by Chaudhary and N. K. Pathak. The mound (pl. XVI A), approximately 150x 100 m with 5-m accumulation, is situated on the left bank of the river Kunwari, a tributary of the Chambal.

Period I (protohistoric) was divided into three sub-periods. Period I A, a deposit of extraordinarily-hard blackish-yellow soil, yielded grey ware, black-and-red ware, red ware and black ware. The frequency of grey ware was less. Basket-impressions were noticed on red ware. The shapes are mostly bowls and dishes. The predominating pottery of Period I B is grey ware. Other wares are black-and-red, black-slipped, fine and coarse red ware. The shapes in fine red ware have similarity with Malwa pottery. The shapes include bowls and dishes. Period I C is continuation of I B but for the introduction of N.B.P. Ware. The grey ware of the earlier phase was devoid of paintings, but in this sub-Period the ware is painted and should be termed as Painted Grey Ware. Other finds from Period I are lumps of iron and terracotta collared beads, pendants, bangles and wheels.

The pottery of Period II (Maurya-Sunga) is generally similar to the pottery obtained from such levels in northern India. The red ware is predominating, whereas the grey ware is rare. A chocolate-slipped ware with incised designs (pl. XVI B) seems to be a local industry, which appears in this period and survives in the subsequent periods. Other finds are: terracotta bull, bead and ball; shell bangles; carnelian bead; stone ball and incised plaque; a miniature iron vessel and nail; and a lump of iron. The characteristic Sunga terracotta figurines are absent.

The pottery of Period III (Kushana) includes bowls, sprinklers, knobbed lids and vases, some of the latter having stamped designs and spouts. The associated finds are: terracotta animals, seal, bead, disc, cake, bangle, ball, stopper and wheel; shell bangle; carnelian beads; stone incised plaque, tablet, round slab; and iron arrowhead, hook, nail, clamp and ore.

The pottery of Period IV (Gupta) is similar to that recovered from the Gupta levels at the sites in northern India. An important feature noticed is the occurrence of multiple ovens. The other finds are: fragments of ivory and glass bangle; terracotta bead, stamp, tablet, beaked bird, dabber, stopper and lamp; semi-precious stone bead; quartz hexagonal bead; stone muller; copper spear-head; and iron spear-head, nail, U-shaped clamp and a fragmentary vessel.

The pottery of Period V (post-Gupta) resembles that obtained from the post-Gupta levels at the sites in northern India. The other finds are: ivory and glass bangles; terracotta bead, pendant, ball, tablet, fragmentary horse head, stopper and wheel; stone rubber, ball, tablet, bead and grinding stone; and fragments of iron knife, axe and sickle. A hearth was noticed at a depth of 71 cm.

Loose sculptures and remains of a temple of tenth-twelfth century AD are found at the eastern end of the mound.

35. EXPLORATIONS IN DISTRICT NARSINGHPUR.—An exploration of the central Narmada valley around Devakachar was carried out jointly by G. L. Badam and Salahuddin of the Department of Archaeology, Deccan College Post-graduate and Research Institute, Pune. Besides exploring the already-known sites at Talaya Ghat, Gauri Umaria and Ratikarar, five new sites, both fossiliferous and implementiferous, came to light. These are Komhdi (Lat 79°10'08" E; Long 22°59'37" N) on the river Sher, Dhobghat (Lat 79°10'45" E; Long 22°59'48"N) on the river Umer, Chhindaghat (Lat 79°06'45" E; Long 22°59'45' N) and Daubaro (Lat 79°06'32" E; Long 22°59'53" N), both on the river Varurewa, and Rampiparia (about 2 km south-east of Devakachar) on the Singhri nullah. Broadly, two lithological units can be identified in all the exposed sections—the sandy pebbly gravel (Lower Narmada Group) capped by yellow or red sandy silt and gravels (Upper Narmada Group). The richest concentration of fossils, however, comes from the Upper Narmada Group.

The faunal collection comprises the osteological and dental remains of *Hippopotamus* sp., *BosjBubalus, Cervus* sp., *Equus namadicus* and *Elephas* sp. A jaw of *Hexaprotodon* (?) *namadicus* was also collected from Talaya Ghat. Our preliminary palaeontological studies show that *Hexaprotodon namadicus* may be older (possibly of Middle Pleistocene period) than other fossils of late Pleistocene age. The presence of this older fossil (if confirmed) would suggest that there may be older deposits of Middle Pleistocene age and the fossil under study is occurring in the secondary context at Talaya Ghat.

In the course of explorations a large number of Lower Palaeolithic, Middle Palaeolithic and Mesolithic tools were collected. The Lower Palaeolithic tools include handaxes, cleavers and scrapers made on sandstone and quartzite. Most of these artefacts were collected from within the cemented gravel.

The Middle Palaeolithic tools which came from the yellow sandy silts and gravels consist of points, borers, scrapers and cores. The tools are fashioned on sandstone, quartzite, chert and chalcedony. The Mesolithic tools, mostly comprising scrapers, a few fluted cores and points, were collected from the surface only. All these tools are made out of chert and chalcedony.

Besides, Upper Palaeolithic tools including blades and scrapers made out of chert and jasper were collected from the terrace surface at Daubaro. This is the first authentic record of Upper Palaeolithic tools from the central Narmada valley.

36. EXPLORATION AT BHIMBETKA, DISTRICT RAISEN.—In continuation of last year's work *(1980-81,* pp. 35-36) S. S. Gupta, assisted by A. S. Stevenson, K. V. Ramanrao, A. J. Nambiraju, P. Biswas and V. S. Vyas, under the guidance of K. D. Banerjee of the Prehistory Branch of the Survey studied the rock-shelter paintings and explored the area around Bhimbetka.

This year Zoo rock and Rang Mahal shelters have been chosen for detailed study. In both the shelters figures of warriors have been found riding on horses and elephants. They are armed with sword and shield, bow and arrow, spear and dagger. Human beings are depicted playing on *vina* and drum etc. Their dress is very significant, as human beings are shown in skirt also. Animals depicted on the shelter are wild as well as domestic. However, most of the animals are domestic, e.g. donkey, dog, horse and cattle. The paintings are drawn in different colours such as white, light red, dark red, yellow ochre and chrome orange. There are instances of superim-position also. However, there is no possibility of exact dating of the paintings directly due to lack of sufficient superimpositions. Even then there is no reason to put them as prehistoric. It is clearly demonstrated that these shelters were occupied by Buddhist monks during early historic period. A monastic complex in ruins has been noticed at Bhimbetka and in some of the shelters platform and pavements have been found. The paintings such as hunting scenes etc. as shown in the rock-shelters at Bhimbetka may come only after the end of the Buddhist occupation.

A Buddhist complex has been noticed at Bineka (Lat 23°55' N; Long 77°3O' E), 45 km south of Bhopal on Bhopal-Hoshangabad National Highway. It is a rectangular structure of dressed stones followed by an enclosure wall. Inside the structure, ruined stupas and monasteries are noticed.

Another extensive Buddhist complex, discovered by Tiwari in Lakhajuar (Lat 22°56'N; Long 77°35' E), 3 km west of Bhimbetka, has been examined. A bund, pavements leading to the rock-shelters, gateway in one rock-shelter, stupas, monasteries and platforms, all made of dressed stones, have been found in the complex.

37. EXCAVATION OF PAINTED ROCK-SHELTERS AT BHIMBETKA, DISTRICT RAISEN.— S. S. Gupta, assisted by A. S. Stevenson, K. V. Ramanrao, A. J. Nambhiraju, P. Biswas and V. S. Vyas, under the guidance of K. D. Banerjee of the Prehistory Branch of the Survey, excavated two painted rock-shelters and the site of Chhoti Jamun Jhiri at the foot of Bhimbetka hills for the purpose of checking trenches of BHM-1 (III-F 23, BB-25), BHM-3 (III-F-24) and six trenches at Chhoti Jamun Jhiri excavated earlier by V. N. Mishra and V. S. Wakankar. Evidence shows that the floors of these shelters are erosional and consist of natural rock deposition and can not be occupational debris. The results of the excavation are as follows.

The trench numbered BHM-1 (III F-23, BB-25) was laid out towards west of the shelter between the two joints of rock, as there was no place left for excavation by earlier excavators. It could be dug up to the depth 75 cm with great difficulty. Huge stone blocks emerged in the trench which were taken out by hammering. The first deposit measured up to the depth of 5 to 20 cm. Few microliths comprising blades and points made on chalcedony, jasper and chert and some potsherds of grey ware came from this deposit. Next deposit encountered was from 20 to 50 cm. It was brownish clay with stone chips. Numerous angular stones and stone chips have been found in the deposit. The third deposit was of reddish brown clay with more decomposed stone chips. No prehistoric artefacts could be recovered from the last two deposits.

The deposit in Trench 2, BHM-1 (III F-23 BB-25) was found to be 1.30 m deep. The first deposit, consisting of blackish clay with stone chips, loose in composition, occurred up to a

depth of 60 cm. Few microliths comprising blades and fluted cores made on chalcedony and jasper have been found up to a depth of 15 cm. Three broken grinding stones made on trap and standstone have been recovered from this deposit. Some of the angular and sub-angular stones found in the deposit are marked by prominent bulb of percussion. The next deposit of yellowish-brown clay with decomposed stone chips was encountered at the depth of 60 cm to 1-30 m. Its composition was variable. At some places it was loose, whereas at others it was very compact. At a depth ofl.30 m two huge stone blocks emerged in the trench, which stopped further digging. Deposit was completely devoid of perhistoric stone implements.

With a view to checking the stratigraphy of earlier excavation, the excavated trench, BHM-3 (III F-24), was extended towards the west. Digging could be carried up to 2-80 m only, as joints of rock appeared at this depth. Deposit of blackish clay, loose in composition, continued up to a depth of 40 cm. Microliths comprising blades, fluted core and bladelets, made on chalcedony, jasper, and chert have been found from this deposit. Their quantity diminished with the depth. Roots of tree also appeared in the deposit. In the underlying deposit, which is brownish sandy soil (from 40 to 60 cm), very few microliths have been recovered; numerous angulor and sub-angular stone chips have been found. Some of them are characterized by their bulb of percussion. The third deposit, below 60 cm, consists of brownish loose soil mixed with disintegrated rock chips. A large quantity of natural stone flakes have been noticed. Among them very few have bulb of percussion. Below the depth of 85 cm brownish sandy soil with big boulders, loose in composition was encountered upto 2'12 m. A doubtful handaxe, one cleaver and very few flakes have been recovered. Besides these, angular stones also have been collected from the deposit. Digging was stopped due to the emergence of the stone block and rock-joints in the eastern and western side of the trench.

To trace out the laterite and bed-rock, digging was done in the northern side of the trench (earlier excavated). At a depth between 2.12 to and 2.80 m (filled-up material, sticky blackish clay) natural quartzite flakes, microliths and a modern bangle piece have been recovered. Nothing was found in the deposit of decomposed shale (yellowish-red in colour, very compact) from the depth of 2.80 m to 3.40 m. At the depth of 3.40 m, joints of the rock have been mingled with each other.

Chhoti Jamun Jhiri is 2 km south-east of Bhimbetka and 1 km east of Bhianpur. Four trenches have been laid out here to check the palaeoclimatic studies.

Stratigraphy from the top to the bottom in Trench 1 is as follows: (i) brownish sandy soil, loose in composition, from 50 to 40 cm in depth, in which stone pieces of chalcedony, chert, carnelian and agate have been found; (ii) yellowish-brown limonite from 40 cm to 1.35 m (after the depth of 80 cm it became very compact) in which few sandstone pieces have been recovered; and (iii) reddish-yellow decomposed sandstone and shale from 1-35 to 2 m in which nothing has been found. Bedrock has appeared at the depth of 2 m.

Deposits of Trenches 2 and 3 are identical with that of Trench 1.

The stratigraphy from the top to the bottom in Trench 4 is as follows: (i) blackish sandy soil, sticky in nature, from 5 to 26 cm in depth; (ii) reddish sand from 26 to 30 cm, very loose in composition; (iii) yellowish sand, slightly compact, from 30 to 38 cm depth (charcoal has been found in very less quantity); (iv) brownish sandy soil from 38 cm to 1.90 m (it has become more compact below the depth of 80 cm); (v) brownish sandy soil with yellowish patches, from 1-00 m to 2.20 m; and (vi) from 2.10 m to 2.60 m the deposit is wet (this level corresponds to the water level of the adjoining nullah).

At the depth of 2.60 m a stone block appeared towards the south-west of the trench. No prehistoric stone artefact has been recovered from the entire digging.

38. EXCAVATION AT NANDUR, DISTRICT RAISEN.—In continuation of last year's *(1980-81,* p. 37) work, the Department of Archaeology and Museums, Government of Madhya Pradesh,

under the direction of K. K. Chakravarty, assisted by G. Krishna, R. R. Singh, O. P. Misra, Vinod Joshi, S. K. Soni and L. P. Kadam, and Saugar University under the direction of S. K. Pandey and his team resumed the excavation at NDR-1 and the southern side of a semi-circular ditch inside the township respectively. As a result of the excavations, several structural remains (pl. XVII B), a brick well and a ring-well were exposed, besides pottery and other finds.

The pottery consists of N.B.P. Ware, red ware bearing yellowish cream slip and painted with black bands, black-and-red ware and coarse red ware. The excavation yielded terracotta sealings assignable to the Gupta and Kshatrapa periods (pl. XVIII A). One of the sealings bears legend in the box-headed characters. The name may be Dattanaga. The second sealing records *dasgama devadasa,* meaning perhaps 'Devadasa, the ruler of ten villages'. Last year a signet ring of this ruler (Devadasa) was found on the surface. The third sealing bears *maharajaraut* in Brahmi characters. The fourth sealing bears the legend *matrasena,* while the one from the Kshatrapa level bears the legend *nigamasa.* Finds include: punch-marked, cast and Naga coins; silver coins (one each of Aurangazeb and Faruoqsyar); ivory and terracotta female figures; terracotta animal figurines; beads of terracotta and semi-precious stones; copper wheel, antimony rod, arrowheads; and iron objects of domestic use (pl. XVIII B).

As a result of the excavations, the following Periods could be established: Period I A (pre-Mauryan, seventh to fourth century BG) ; Period I B (Mauryan, fourth to second century BO) ; Period II (Sunga-Satavahana, second century BG to second century AD) ; Period III (Kshatrapa-Naga, second to fourth century AD) ; Period IV (Gupta, fourth to sixth century AD) ; and Period V (medieval, seventh century AD).

39. EXPLORATION IN DISTRICT RAISEN.—Dharampala of the Central Circle of the Survey, explored 97 villages in the district. The sites where antiquarian remains were noticed are listed below.

Tahsil	*Village/site*	*Antiquarian remains*
Bareli	Bamanwada	Early historical site with black-and-red were
-do-	Barahakalan	Historical site and pottery
-do-	Chabara	Historical site with pottery and 3 *sati* pillars
-do-	Dandiakhera	Early historical site with pottery
-do-	Dehrikalan	Early historical site with black-and-red ware
-do-	Dhonkhera	Early historical site with pottery
-do-	Khiribramchari	Late medieval temple
-do-	Mangrel	Historical site with pottery
-do-	Mankapur	Three early historical sites with black-and-red ware
-do-	Mutaisar	Historical site, ruins of medieval Brahmanical temple and an image of Mahesa
-do-	Sonkhera	Early historical site
Baseli	Alipur	Historical site with pottery and medieval Brahmanical sculptures
Gairatganj	Garhi	Microliths and a Gond fort in ruins
Raisen	Amrawad	Historical site with pottery
-do-	Bakuichiwana	Medieval fragmentary Brahmanical sculptures
-do-	Bharda	Microliths
-do-	Bilara	Historical site with pottery
-do-	Kharkod	Painted rock-shelters with white and red paintings and microliths

Tahsil	*Village/site*	*Antiquarian remains*
-do-	Manpur	Ruins of medieval temple and Brahmanical sculptures
-do-	Sarsoda	Historical site with pottery
-do-	Soida	Medieval Brahmanical sculptures
-do-	Tajpurmahal	Late Stone Age tools

A team of the Directorate of Archaeology and Museums, Government of Madhya Pradesh, under C. Krishna, surveyed the region. A group of rock-paintings made in green and haematite colours were noticed inside a rock-shelter on the bank of the river Ajnal, near Ramgarh. It bears hunting and battle scenes. Besides, it also yielded a number of Lower Palaeolithic tools, such as Acheulian handaxes, cleavers, discoids, scrapers and flakes, all made on quartzitic stone. These tools clearly indicate the extension of the Narmada Stone Age culture complex in the Betwa valley.

Besides these, a number of stone sculptures of Brahmanical and Jaina pantheon of medieval period were noticed around Nandur, Peepalay, and neighbouring villages. The most notable images represent Jaina Tirthankara, Surya, Karttikeya, Ganesa and Vishnu. The temple-remains include a door-lintel bearing *navagrahas* and *sapta-matrikas* and door-jambs with Ganga, Yamuna and floral designs. The ancient mounds of Nandur yielded sculptures of Chamunda, Mahishamardini, Vaishnavi and Kaumari. The discovery also includes remains of a Buddhist stupa.

The stone sculptures on the bank of a tank at Gulgaon represent *yaksha, nagaraja* (pl. XXXI B), Buddha and *sahasralinga.* Following the theft of the *yaksha* image, most of the sculptures have recently been shifted by the villagers.

Inscriptions on two *sati* stones in Devanagari characters indicate the conquest of the region by an Afghan chief during the Mughal period.

40. GEOLOGICAL-ARCHAEOLOGICAL INVESTIGATIONS IN THE GANGA, BELAN AND MID-SON VALLEY, DISTRICTS ALLAHABAD AND BANDA (UTTAR PRADESH) AND DISTRICT SIDHI—Under the directorship of G. R. Sharma, Department of Ancient History, Culture and Archaeology, University of Allahabad, geological investigations in the valleys of the Ganga, Yamuna, Belan and bon and excavations in the mid-Son valley, District Sidhi, Madhya Pradesh, were carried out. J. Desmond Clark of Berkeley University, California, U.S.A. and his team also joined this expedition as invitee scholars. In this work G. R. Sharma was assisted by V. D. Misra BB Misra. J N. Pal, Umesh Chandra Chattopadhyaya, Ranjeet Singh, D. K. Shukla, Prakash Sinha D N. Tewari and other members of the technical staff. Desmond Clark was assisted by B. Clark, Martin Williams, Michel F. Clark, Jonathan Mark Kenoyer, Robert John Blumenschine, Francis Barhara, G. S. Khanna and Bill.

In continuation of the geological investigations in the mid-Son valley in 1980 a team of geologists consisting of M.A.J. Williams and M. F. Clarke of Macquire University, Australia, carried out geological investigations in the valleys of the Ganga, Belan and Son.

In the Ganga valley major sections were studied at three places namely Jhusi, Sringaverapura (District Allahabad, Uttar Pradesh) and Telauli, the last one situated 2-3 km downstream of Mau in District Banda (Uttar Pradesh), on the Yamuna. At Jhusi, 1 km upstream of the Ganga-Yamuna confluence on the left bank of the Ganga, yellow-brown calcarious silt, measuring 22 m_5 was found superimposed by a protohistoric mound! Beneath the

silt there was noticed a 5 m thick cross-bedded re-worked carbonate nodules. A few shell samples were collected for computing the chronology of the Pleistocene deposits. At Sringaverapura at least 10 m thick alluvium was recorded above the present flood level of the river Ganga, suggesting thereby that the river had entrenched into its end-Pleistocene or early Holo-cene flood plain roughly by 10 m. In this connection it is interesting to note that this entrenchment is not suggestive of a fall in sea-level which was steadily rising until about 6000-7000 BP. The Telauli section on the Yamuna offers parallels with the sections of the Ganga noted above. In the Yamuna section two shell-beds were observed from which samples for radiocarbon dating were collected. These samples, when processed, may yield valuable information for constructing the chronological framework for some of the end-Pleistocene horizons of the Ganga valley.

Between Chopani-Mando in the east and Amilia in the west Belan, sections were studied at eight places, the important ones being Mahagara, Chillahia, Deoghat bridge, and Chopani-Mandi.

The combined picture emerging from the stratigraphic investigations vis-a-vis their associated archaeological finds is as follows:

No.	*Nature of formation*	*Industry*	*Age*
1.	Tabular sandstone conglomerate over Upper Vindhyan sandstone bed-rock	Lower Palaeolithic	Middle Pleistocene ?
2	Calcarious brown clay loam	Sterile	Middle Pleistocene ?
3	Planar and cross-bedded sandstone gravels	Middle Palaeolithic	
4	Reddish-brown sandy clay and clay loams	?	Upper.Pleistocene ?
5	Shell-bearing gravel(s), mostly rolled carbonate nodules and black iron-stone Pisolites		Upper-Pleistocene (*circa* 2500 to 1000 BP)
6	Brown and yellow-brown calcarious clay loam and sandy clays, minor intraformational gravels, mainly rolled carbonate nodules	Upper Palaeolithic to Epi-Palaeolithic and Mesolithic ?	Late Upper-Pleistocene (c.25000 to 1000 BP)
7	Clays, loams and fine alluvial sands	Mesolithic, Neolithic and Proto-historic aretefacts	Holocene

The geologists were inclined to interpret the units 2, 4 and 6 of the above chart as loesswind-blown dust suggesting thereby that the concerned climate was drier and windier than today.

Geological investigations were carried out in the mid-Son valley between Byavharkhand village in the east and Jogdaha bridge in the west with particular emphasis at Baghor area, Nakjhar khurd and Rampur. The stratigraphic sequence with archaeological finds in the Baghor area from top to bottom is tabulated below.

No.	*Nature of formation*	*Industry*
1.	Red-brown (orange) sandy clay loam	Neolithic
2.	Brown clay loam	
3.	Grey-brown sandy clay	Mesolithic
4.	Debris flows (shale rubble)	Mesolithic

No.	*Nature of deposit*	*Industry*
5.	Very dark grey-brown vertisolic clay	
6.	Grey-brown mottled clay loam/Upper Palaeolithic sandy clay, grading downwards into	Upper Palaeolithic
7.	Brown loess (clay loam/sandy clay) greyer upwards, yellow-brown down profile; minor intraformational shale and carbonate lenses	
8.	Interbedded red-brown clays (weathered older loess?) and sandstone/shale debris flows in red-brown clay matrix	
9.	Water-laid sandstone cobbles and gravels	Large core and flake, possibly Upper Palaeolithic

The tentative results obtained with regard to the stratigraphy and sequence of the lithic industries of the mid-Son valley from bottom to top are given below.

No.	*Nature of deposit*	*Industry*	*Age*
1.	Bed-rock erosion and sedimentation of lower Vindhyan meta-sediments Deposition of fine sandy-clay loess during and after accumulation of Sihawal Formation gravels	Lower Palaeolithic	Early to Middle Pleistocene
	Erosion		
2.	Deposition of Patpara Formation, gravelly clays and fluviatile sand	Upper Acheulian to Middle Palaeolithic	Middle to Upper Pleistocene
	Erosion		
3.	Baghor Formation: channel sands, overbank clays and yellow brown loess	Middle to Upper Palaeolithic Upper	Upper Pleistocene
4.	Down cutting of the river, lateral plantation and terrace formation resting against the old formation	Palaeolithic Mesolithic & Neolithic	Pleistocene-Holocene

These investigations, needless to say, have brought to light the occurrence of widespread Upper Pleistocene loess in the Belan and the Son valleys. The shell samples collected from different horizons of the Pleistocene formation are likely to put our Middle and Upper Palaeolithic industries on firmer footing. It is also hoped that it would be possible to correlate the continental loess stratigraphy of north-central India with the Quarternary marine stratigraphy of Indian Ocean deep sea cores on the one hand and the Chinese loess stratigraphy on the other.

41. EXCAVATION AT BHAGHOR, DISTRICT SIDHI.—Under the direction of G. R. Sharma, Department of Ancient History, Culture and Archaeology, University of Allahabad, a team in continuation of previous work *(1979-80,* pp. 49-50), resumed excavation at Bhaghor.

Excavations at the Upper Palaeolithic site of Bhaghor I situated at a distance of about 4 km north-east of Merhaoli village in the Gopad-banas sub-division of the district in 1980 had exposed heavy concentration of artefacts. It was evident that these artefacts were locally produced. With a view to determining the extent of artefact-concentrated area, excavation was conducted at the site this year. In all an area of 182 square metre was opened for excavation. Of this, 130 square metre was extended in the south, 26 square metre in the west, 24 square metre in the north and 2 square metre in the south.

The excavation was carried to a depth of 65 cm, divisible into 3 layers. Layer 1, the existing top surface, is essentially a part of the underlying yellow loam, loose in texture, dull yellow-brown in colour and loamy in composition. Its thickness varies, the maximum being about 10 cm. Layer 1A is undisturbed yellow-brown loam, hard as compared to layer 1, and is 20-25 cm thick. Layer 2 is light grey or greyish-brown clay, its thickness ranging from 17 to 20 cm. Layer 3 is composed of dark-grey clay and varies in thickness from 5 to 10 cm.

The exposed surface showed many interesting features of occupation. In the heavily-concentrated artefact-area large number of nodules, split nodules, fluted cores, blades, flakes and chips were found along with finished tools. Mostly confined to the periphery of heavily-concentrated areas, there were hammer stones and anvils in association with cores, blades and flakes. Seemingly, these indicate the actual tool-manufacturing spots. In the exposed squares were found sandstone rubbles with rubbed surfaces, probably used as lower grinding stone. Most of the artefacts are fashioned on cherty materials, though chalcedony has also been used as a raw material. That the nodules of chert were heat-treated, before these were put to manufacturing, was evident by the occurrence of a large number of heat-spalled nodules, cores, flakes, blades and even finished tools. The heat-treatment experiment on chert nodules collected from the river-bed surprisingly showed the original yellow colour of cortex turning to red on heat-treatment as noticed in the case of excavated assemblage of Bhaghor I.

In 1980 complete lifting of artefacts, due to shortage of time, was confined only to squares of H line (10 squares). But this year the artefacts of the entire exposed area were lifted after proper plotting and recording.

The analysis of artefacts is in process. The main tool types include straight-backed blades, convex-backed blades, partially-backed blades, double-backed blades, backed and truncated blades, partially backed and truncated blades, straight-backed blades with orthogonal truncation, blades with oblique truncation, denticulated blades, half-backed and half-denticulated blades, denticulated backed and truncated blades with distal sharpening, fully denticulated blade with distal truncation, denticulated backed blade with double truncation, retouched blades, blades with ouchtata retouch, scalene triangles, parallelogram, trapezoid with denticulating backing, drill, percoir, side scraper, convex side scraper, end scraper, transverse scraper, bee, etc. Besides these heavy duty tools, hammer stones, lower and upper grinding stones made of sandstone and choppers made of siltstone also have been found.

During the closing of the excavation, while lifting the artefacts, a circular platform of sandstone rubble was discovered. In squares 1-9 and 1-10 (2 squares), after lifting the artefacts, a number of standstone fragments were encountered. After clearing the chert artefacts interspersed with stone rubbles it was noticed that the sandstone rubbles formed a roughly circular platform about 85 cm in diameter. In the centre of the platform was a fragment of a natural ferruginous stone concretion with concentric, triangular lamination, the colour ranging from light yellowish-red to dark reddish-brown. In all ten fragments of this stone were found and they all joined together to form a triangular natural stone, measuring 15 cm, 6.5 cm and about 6.5 cm in height, width and thickness respectively. As seven out of ten fragments were

found in the centre of the platform, the spot where triangular ferruginous stone was placed might have been a place of worship. Because of quite weak physical structure of the stone due to lamination, it cracked, broke apart and was scattered on the rubble of the platform.

Archaeologically, it can be said that the platform was made by man and a unique and colourful stone was placed as an object of worship. With the passage of time the stone was broken and the platform was partially covered with artefacts. Incidentally, it may be pointed out that some of the tribes, i.e. Kol, Bhaiga, etc. living in the area use similar colourful natural stones with concentric formations as a symbol of the Mother Goddess. Thus ethnographic parallel suggests that the structure in question exposed at Bhaghor I may have been a shrine of Mother Goddess.

Bhaghor II

With a view to ascertaining the extent and character of the Mesolithic settlement, excavation was resumed at Bhaghor II. In all an area of 65 sq m, mainly to the north-east of the previously excavated area, was excavated. The excavation was carried to a depth of 30 cm from surface. There were three layers: Layer 1 was yellow loam with a thickness of 14 cm; layer 2A, a deposit of gravelly-clay, was 10 cm thick; and layer 2 B with the excavated depth of 6 cm contained granules mixed with clay.

The excavation brought to light microliths, fragments of querns, mullers, hammer stones, anvils, hammer stone-cum-anvils and sharpener. A few fragile potsherds were obtained from the topmost layer. As many as forty-one post-holes constituting one oval and five semi-circular hutments were also exposed in layer 2 B.

Microlithic assemblage is characterized by small blades and is divisible into the following three categories: (i) unmodified waste comprising flakes with or without cortex, blades, core-trimming flakes, cores, flake/blade fragments, chunks, pebble/nodules; (ii) modified pieces consisting of flakes, blades, flake/blade fragments and chunks; and (iii) retouched pieces or finished artefacts comprising backed blades, truncated, denticulate, borers, scrapers, retouched flakes/blades, lunates, triangles, trapezes and used pieces. The artefacts have been fashioned mainly on chalcedony agate, etc., though cherty material has also been used in good number. The tools are reduced in size, fresh and show fine workmanship.

Bhaghor III is situated approximately half way between Bhaghor I and Bhaghor II. In 1980 a trial trench was laid out at the site for ascertaining the stratigraphy, horizon and nature of blade/bladelets found scattered at the site, but only the stratigraphy and horizon of the artefacts could be ascertained and not the nature of the industry, as only sixty-eight stone artefacts were obtained from 3 square metre. Of these, shaped tools, modified pieces and unmodified waste numbered two, three and sixty-three respectively.

The archaeological significance of Bhaghor III lay in the fact that it offered the earliest stratigraphic evidence for small blade industry in the mid-Son valley, Madhya Pradesh. This year, with a view to ascertaining the nature and character of small-scale industry with reference to stratigraphic horizon of the blade industry, a trench, 5 square metre, was laid out to the north of the previously-excavated spot. Of this only 4 sq. m area was available for excavation. The excavation was conducted down to a depth of 1-17 m. It confirmed the stratigraphic horizon of the eroded artefacts. The excavation exposed three distinct layers: layer 1 (humus), layer 2 (yellow sandy loam) and layer 3 (greyish clay). From the humus (disturbed) were obtained a few microliths fashioned on chalcedony and two small unidentifiable pottery pieces. The underlying layer, yellow sandy loam, also yielded a few microliths made on chalcedony and comparable to the microliths of Bhaghor II.

The eroded stone blades/bladelets horizon, almost in horizontal plane, was confined between 75-85 cm below the surface. A good number of shaped tools, modified pieces amidst unmodified wastes were obtained, fashioned mainly on greenish chert. Shaped tools comprise

backed-bladelets, truncated bladelets, lunates, triangles, trapezes, borers, scrapers and retouched/ modified pieces. Unmodified waste contains flakes, blades, flake/blade fragments, cores and chunks. Pieces of haematite and two animal teeth (probably of bovide) were the other finds from the layer.

On the basis of stratigraphy, technique and typology, the blade industry has been assigned to late Upper Palaeolithic phase, and of the three sites excavated in the area, i.e. Bhaghor I, Bhaghor II and Bhaghor III, the last one appears to be the earliest—stratigraphically and on techno-typological consideration.

42. EXCAVATION AT KUNJHUN, DISTRICT SIDHI.—G. R. Sharma of the Allahabad University, Allahabad, and his team excavated at Kunjhun II (Lat 24°33'30" N; Long 82° 12'32" E) situated on the right bank of the river Son. The site was put on the archaeological map *(1975-76,* pp. 25-27) when corded ware was recovered from the spot (designated as Kunjhun I) to the north of the village. This year in the course of exploration in the area a few blades, animal bones, all encrusted with calcium carbonate, were found on the top of the last terrace (Khetauhi Formation) of the river Son. With a view to ascertaining the horizon of these objects a trench, measuring 4 sq m, was laid out at the junction of the Khetauhi Formation and the old terrace. The trench was further extended in the south by 1 m. Barring four squares, excavation was conducted down to a depth of 1.30 m and in remaining four squares down to a depth of 2-6 m. In all six occupational levels were exposed. Of these upper three levels were in the red-brown sandy clay loam, while the lower three levels were in grey brown sandy clay characterized by *kankars.*

The excavation brought to light cores, flakes and finished tools in clusters along with burnt clay lumps, animal bones and sandstone fragments of varying sizes. Cobbles of chert and chalcedony furnished evidence of heat-treatment. Besides cores and flakes, the shaped tools fashioned on chalcedony and chert consisted of scrapers, points, blades, triangles, trapeze, lunates and crested-ridged specimens. The tools are fashioned on long thin blades and evince a workmanship of high order.

A good number of animal bones were found scattered in almost all the layers, though the concentration was in the lower levels. The animal species include cattle, deer and antelope, often with cut-marks. The available bones belong to wild animals. Charcoal samples collected from different levels are likely to furnish dates about the age of the cultures. On the basis of the nature and character of the lithic industry, the assemblage may be assigned to a late phase of the Mesolithic culture.

At a distance of 100 m to the north from the excavated site of Kunjhun II, Desmond Clark while exploring the area, extracted a few sherds of corded ware in an excellent state of preservation from the river section. With a view to ascertaining the horizon of the pottery on one hand and nature and character of the deposit on the other, a step-trench was laid out in the Khetauhi Formation, the last terrace of the Son. In all 14 sq. m was exposed. The maximum depth obtained measured 9 m, divisible into five units counted from the base: (i) coarse sand (yellow sand) with the sprinkling of stone nodules (1 m in thickness); (ii) greyish clay, embedded with shell (32 cm); (iii) gravel (30 cm); (iv) sand and clay bands (40 cm); and (v) alternate silty/sandy deposits (upper top).

Potsherds and animal bones were found scattered, starting from a depth of 3.7 m to the bottom.

The ceramic assemblage consisted of corded ware, red ware, coarse black-and-red ware, black ware and gritty ware. Sizable number of sherds are burnished. Painted pottery was also obtained. In character, the ceramic assemblage is coarse to medium in fabric. The clay used for making the pottery is not well-levigated as would be evident by its being gritty. Rice and rice-husk have been used as degraissant. Ranging from thick to medium in section, the pottery

is handmade and insufficiently fired. The available types include large and medium-sized vases, generally with carinated or concave neck, deep, ovaloid, convex-sided and shallow bowls, spouted vessels, basins, platters, etc. Decorated sherds are also met with. Incision and applique patterns are found on many sherds. A few potsherds bear painting *m* black pigment over red surface; such sherds, obtained from the upper horizon are similar to those of the Malwa Ware.

The excavation yielded a good number of animal bones also, often in an excellent state of preservation. The species include cattle, deer, antelope and dog. Microliths, consisting of blades, cores and flakes, have also been obtained, though the number is not impressive.

The excavated trench has not yielded evidence of settlement, but absence of rolling on potsherds suggests that these have not travelled much before their getting deposited. The ceramic industry in comparison to that of Koldihwa and Mahagara in the Belan valley exhibit evolved traits in firing and finish. The occurrence of a few sherds of the Malwa Ware in the assemblage may also suggest the contact between the two cultures—Neolithic and Malwa.

43. EXCAVATION AT RAMPUR, DISTRICT SIDHI.—G. R. Sharma of the Allahabad University, Allahabad, and his team carried out excavation at the Epi-Palaeolithic site of Rampur (Lat 24°33'30" N; Long 82°12'30" E), which is situated on the northern bank of the Son. With a view to ascertaining total thickness of artefact-bearing horizon a trench, measuring 1 sq. m, was laid out almost in the centre of the site. The excavation was conducted down to a depth of 85 cm. The total accumulation was divisible into three layers: lower sandy stuff (10 cm), red-brown sandy clay loam (20 cm) and sandy clay loam (percentage of sand increased). The artefacts were obtained down to a depth of 30 cm, i.e. from layers 1 and 2 only, the concentration being near the top. The assemblage included cobbles, cores, flakes, blades, finished artefacts and debitage fashioned mainly on chert. Evidence of heat-treatment was noticed on many specimens. The lithic assemblage of Rampur compares well with that of Bhaghor I, in tool typology, technique and use of raw material.

The excavation at the site established the fact that the Epi-Palaeolithic man did not open his workshop on the base rock-surface but on red-brown sandy clay loam.

44. EXPLORATION IN THE MID-SON VALLEY, MIRZAPUR, UTTAR PRADESH, AND SIDHI, MADHYA PRADESH.—B. B. Misra of the Department of Ancient History, Culture and Archaeology, University of Allahabad, at the instance of G. R. Sharma, conducted extensive exploration in the south-western parts (south-western parts of Robertsganj and western part of Duddhi sub-divisions) of District Mirzapur, Uttar Pradesh, and adjoining eastern regions (Deosar and Singrauli sub-divisions) of District Sidhi, Madhya Pradesh, bounded by Kaimurs in the north, the river Mear (Mayar) in the south, Kanhar in the east and Gopad in the west. As an amalgam of ridges and valleys, bare rock expansions, sheltered alluvial basins, thick forest covers and agricultural lands, still inhabited mainly by a number of tribal groups with widely varying primitive cultures, the explored region measures about 4466 sq. km (77 km from east to west and 58 km from north to south). The region is drained by the Son and the Rihand along with their various tributaries like Ghaghar, Bijul, Gopad, Balia, Deoshar, Mear, Kachan, Mohan, Saura etc. Explorations resulted in the discovery of a large number of sites ranging from Lower Palaeolithic to Neolithic through Middle and Upper Palaeolithic and Mesolithic. Besides, the above rivers have exposed extensively implementiferous and fossiliferous Quarternary formations. Recent cuttings in connection with the installation of Singrauli Super Thermal power Plant at Shaktinagar (District Mirzapur) have also laid bare similar geological deposits in a number of localities, viz. in the sections of approach channel near the Pump-house of the Plant at Shaktinagar, in a discharge and diversion canals between Telgaon in the east and Jainagar in the west and at the southern foothill of the Kota hill near the northern boundary wall of the plant at Shaktinagar.

The following four distinct geological formations were identified in several sections in ascending stratigraphic order.

1. This oldest formation has a maximum-preserved thickness of about 7 m and is composed of two members—lower coarse or gravel member and upper fine or clay member. The basal gravel member resting unconformably on eroded bed-rock varies in thickness from 4 to 5 cm. The maximum thickness of this deposit is preserved in the cliff sections of the river Kachan near Hirawah locality, between the confluence of the Mayar (Mear) and the Kachan and the village Taldah. It is composed of angular to rounded or sub-rounded class of sandstone, quartzite, shaly limestone and quartz, set in matrix of clay and is very well-cemented. This bouldery gravel is overlain, at several places, by mottled clay, light-brownish or yellowish/ greyish in colour and often containing plenty of calcium carbonates. Lower Palaeolithic artefacts comprising pebble tools, handaxes, cleavers, scrapers, discoids along with core, flakes and debitage made generally on quartzite and chert and occasionally on quartz were extracted from this gravel. Overlaying mottled clay, in the Jainagar locality of discharge canal, has also yielded a few evolved Lower Palaeolithic tools including proto-Levalloisian specimens.

2. With the maximum exposed thickness of 6 m it unconformably rests on Formation 1. The formation comprises massive to crude sub-horizontally-laminated medium to very coarse sand granules and pebbles. The main detrital constituents are quartz, clasts of sandstone shale, quartzite and limestone set in matrix of clay, generally dark-reddish in appearance. This formation is partly cemented with iron granules, rolled and rounded or sub-rounded pieces of agate, chalcedony and other silicious rocks. The upper 3 to 4 m of this formation is dark-brown/ grey mottled indurated clay. Middle Palaeolithic and a few evolved Lower Palaeolithic tools were found from this deposit. This formation is well represented in the cuttings of discharge canal between Telgaon and Jainagar and in the cliff sections of the river Mayar (Mear) and the Kachan near their confluence and also in the section of the Kohrakhor nullah (a branch of river Mohan) at the Sarpdah locality, about 6 km south-east of Jiwan, the sub-divisional head quarters of Deosar tahsil on the Sidhi-Singrauli road.

3. This formation has a maximum thickness of approximately 15 m and rests unconformably on Formation 2. It is made of two distinct units: 3 A, coarse member (sandy gravel) and 3 B, fine member (silty clay).

Composed of quartzite, shale, quartz, chalcedony, agate, chert etc. ranging from medium to very coarse sand granules and pebbles, III A (lower coarse member) often contains evolved Middle Palaeolithic artefacts. A large number of well-preserved fossils of extinct animals like buffalo, hippopotamus, crocodile, rhinoceros, elephant, tortoise, etc. have been obtained from this deposit.

Resting conformably on 3 A, 3 B deposit, widely exposed, is composed of silty dark-brownish/blackish clay. Irregular calcium carbonates occur throughout the deposit. This formation has yielded fresh Upper Palaeolithic tools, made mostly on chert.

4. The fourth and the last geological formation resting on 3 B in this part of the mid-Son valley has a maximum-exposed thickness of about 3 m. It has also two distinct units (4 A and4B).

4 A, the coarse member (gravel), varies in thickness from O5 to 1 m and is composed of rolled calcium carbonate and iron granules and small stone pieces. It has yielded Epi-Palaeolithic-like tools along with early microliths fashioned generally on cherty stuff and quartz.

About 2 m in thickness, 4 B, the upper fine member (silty/sandy clay loam) rests conformably on 4 A. Microliths were extracted from this formation.

This 4 Formation may tentatively be correlated with gravel IV and overlying clay loam of the Belan area. This formation is well represented in the section of the Balia Nadi between the

Matwai village and its confluence with the Saura nullah and also in the section of the Deosar river, near Aunri Moda.

On the invitation of the Department of Ancient History, Culture and Archaeology, University of Allahabad, which conducted prolonged exploration in the adjoining western part of the mid-Son valley between the Son-Banas confluence in the west and the Son-Gopad junction in the east, a team of earth scientists, Martin William and Keith Royce, working under the leadership of Desmond Clark, University of California, Berkeley, studied the Quarternary formation of this part of the mid-Son valley within Chorahat in the west and the Son-Gopad junction in the east in the year 1980. A 30 m thick Quarternary deposit of the region is divisible into four distinct formations in the ascending order *{1979-80,* p. 47). These formations have been named after the type sites which are as under :

I.	Sihawal Formation:	Type section, left bank of the Son, 1 km east of Sihawal (District Sidhi).
II.	Patpara Formation :	Type section, the archaeological site of Patpara (District (Sidhi).
III.	Bhaghor Formation :	Type section, Bhaghor nullah to the south of Bhaghor village.
IV.	Khetauhi Formation :	Type section, right bank side of the Son, 1 km upstream of its confluence with the Rehi river.

A rapid survey of several sections of the explored area revealed both similarity with and contrast to the stratigraphic sequence of the adjoining western region of the Son on the one hand and the Belan on the other. The first formation is nearer to the Gravel I of the Belan rather than the Sihawal Formation of the Son, both in composition and archaeological content. Like the Belan Gravel I the gravel member of Formation 1 has yielded pebble tools, handaxes, cleavers, scrapers, etc. The fine member of Formation 1 has yielded evolved Lower Palaeolithic tools in the section of discharge canal in the Jainagar locality. Formations 2 and 3 correspond to the Patpara and Bhaghor Formations respectively, while 4 is nearer to the gravel IV of the Belan and the overlying clay rather than the Khetauhi Formation of the Son mentioned above. The Epi-Palaeolithic and Mesolithic artefacts extracted from this formation were similar to those recovered from Gravel IV of the Belan and the Khetauhi Formation of the Son.

Explorations have revealed as many as thirteen Lower Palaeolithic sites, of which six factory sites are at Amratoli, Uska and Kachan locality 3. These sites (workshops) are generally located on the elevated rocky plateau in the southern part of the Singrauli basin in close proximity of the river. Of the important sites mention may be made of Baliari and Ganiari. The lithic assemblage both from stratified deposits and workshops comprised pebble tools, handaxes (including lanceolates and picks), cleavers, scrapers, backed knives, spheroids and sub-spheroids, along with a large number of cores, flakes and debitage. The tools from factory sites exhibit different phases of manufacture and are generally unabraded or less-abraded. The principal raw material is coarse-grained quartzite of light-brownish colour, though the specimens made on quartz and cherty stuff are also met with.

Extensive explorations resulted in the discovery of as many as twenty-eight Middle Palaeolithic sites. Of these, ten are factory sites, the important ones being Baliari, Mear 2 and 3, Ganiari, Shahpur, Uska, Kotwar, Sinduria, Khakhan, Kharahia, Mahalpur and Barigavan. These factory sites are located on elevated rocky plateaux, generally abutting the river banks. The assemblage comprised diminutive handaxes, cleavers, discoids, sub-spheroids, scrapers, points and rarely borers and blades along with numerous cores and debitage. Tools are made mostly on medium-to fine-grained quartzite of different shades like dark-brownish, grey, milky white and greenish, flinty chert and occasionally on quartz and jasper, the first being the most prolific raw material.

The industry is flake-based. For removing the flakes both direct percussion and cylinder-hammer methods were used. Some of the flakes bear faceted striking platform. Levallois element is also noticed at some of the sites. Retouching is bold in most of the cases and is done from dorsal, ventral or from both the sides.

Explorations have brought to light twenty Upper Palaeolithic sites. Most of the sites are located in the northern part of the explored area on either side of the Son near the junction of the Son and the Rihand. Strangely enough, no Upper Palaeolithic factory site was found in the southern part (mid-reaches of the Rihand, Balia, Mayar and Kachan valleys). Of the important sites, mention may be made of Ashahanava-ki-pahari (Chopan), Bakhraur, Patwadha, Khairahia and Mahalpur. Out of twenty sites, eight are factory sites. These factory sites are located either on the foot of the medial ridge running parallel to the Son to its north or on the elevated plateaux or detached low outcrops, situated to the south of the Son. The assemblage contains blades with various sub-types (such as retouched, blunted back, parallel-sided, truncated), burins, borers, scrapers, points and occasionally the crude lunates along with numerous cores including fluted ones, flakes and debitage. The tools generally with brownish patina are made on black and grey chert.

The industry is primarily blade-based. Majority of the blade or blade-flakes were removed by punch or pressure technique. However, a few examples with prominent bulb of percussion and bulbar scar as well as shatter marks present in the assemblage were most probably removed by direct percussion method. These specimens bear patches of cortex and irregular flake scars on their dorsal surface and have generally traingular cross-section.

During the course of exploration microliths were collected from eleven Mesolithic sites. Of these Mayar locality 3, Kotwar, Koharakhha (Jogani), Sinduria, Netapur and Mahalpur are noteworthy. Some of these sites (Mayar Locality 3, Kharakhoha, Mahalpur, etc.) are factory sites. The assemblage fashioned on greyish chert, quartz and occasionally on other silicious rocks like chalcedony, carnelian etc. consists of blades (blunted-backs, parallel-sided, truncated and retouched), scrapers, points, borers, lunates, triangles and burins along with a large number of cores (prismatic as well as fluted), flakes and debitage.

Two neolithic sites, Sinduria on the Son and Mahalpur on the Rihand have also yielded neolithic material including celts made on basalt. Microliths were also collected from these sites.

45. PALAEONTOLOGICAL EXPLORATIONS IN THE SON VALLEY, DISTRICT SIDHI.—A team comprising B. B. Misra, U. C, Chattopadhyaya, D. N. Tiwari and Sangam Lai Misra of the Department of Ancient History, Culture and Archaeology, University of Allahabad, explored the middle Son valley, to study the bio-stratigraphy of the alluvial deposits of the Son. The team first studied the step-trench at Nakjhar Khurd for the stratigraphic sequence, which was confirmed at various other sections along the river. The total length of the river section covered from Chilleri (near the junction between the rivers Narkuin and Son) in the west to Bichchhari Baliar in the east was 57 km. The survey was extended to the sections of some tributaries like the rivers Narkuin and Rehi, which meet the Son vertically from north and various important nullahs of the Son. The major fossil-bearing sites that were explored, in view of their fossil- bearing potentialities, comprised Chilleri, Patpara, Tariha Dhaba, Kharbara, Rampur (Medawa nullahs), Baliar, Pawariah, Baghor (Phulwaria nullah, Barki nakhi) etc., along the left bank and Nakjhar Khurd, Odarah, Laowar, Khutelli, Dhabunhi, Bichchhari Baliar etc., along the right bank.

One of the prime objectives of this exploration was to establish the clear identity of the fossiliferous formations by carefully locating the position *(in situ)* of the fossils therein. More than 300 animal fossils were recovered, most of which have come from clear stratigraphic position, the rest being mere surface collection. It was reported t hat among the fossils found *in situ,* majority of them come from the Bhaghor Formation, coarse member, while only a handful

from Bhaghor Formation have been placed in the terminal Pleistocene period. It was further reported that the earlier formations, viz., Patpara and Sihawal, did not yield even a single fossil fragment.

The animal taxa identified are *Gavialis* sp. (Gharial), *Trionyx* sp., *Elephas* sp., *Equus nama-Bos namadicus, Bubalus bubalis, Antilope* sp., *Gazell gazella,* and *Cervus* sp. Besides, some fresh water *dims,* molluscs of both types *Gastropods* as well as *Unio* were also reported. The identified animal species indicate a time-range for the Bhaghor Formation that compares well with the one proposed by the earlier works of the geologists.

Although evidence of rolling was noticed in some bones, it could not be ascertained if they belonged to any preceding formation, viz., Patpara or Sihawal.

Stone artefacts from each formations were collected in order to evaluate their archaeological context. The fossiliferous Bhaghor Formation (coarse member) yielded mainly finished and unfinished Upper Palaeolithic assemblage consisting of agate blades, fluted cores etc., although some Middle Palaeolithic flakes were also reported from its lower horizons. Soil samples were also collected for chemical examination for pH value determination which may, it is hoped, shed light on the problem of non-avaiiability of fossils in some earlier formations.

46. EXCAVATION AT UDAYESVARA TEMPLE, UDAIPUR, DISTRICT VIDISHA.—D. K. Sinha of the Central Circle of the Survey, assisted by P. K. Misra, undertook excavation around the temple with a view to exposing its architectural features below the exposed part of *the jagati.* The excavation revealed several mouldings right down to the bed-rock and a twin platform was noticed in the north-east corner, which runs parallel to the eastern gateway. A few fragments of sculptures and architectural members have been recovered, besides a figure of crocodile (?) swallowing a woman.

47. EXPLORATION IN DISTRICT VIDHISHA.—A team of the Department of Archaeology and Museums, Government of Madhya Pradesh, consisting of R. R. Singh, Mohan Kumar Maheshwari, O. P. Mi.a, L. B. Singh and G. K. Chandrol headed by C. Krishna undertook survey of the Betwa valley and found stone tools made on quartzite and quartz, besides pre-pottery microlithic flake toos at Ganj Basoda in the Betwa valley.

During the survey of Chitoria, Nateran and Tyondoa, sculptures and door-lintels of the medieval period were noticed. The notable sculptures include a *naga-nagi* and *a yakshi.*

MAHARASHTRA

48. EXPLORATION IN DISTRICT AURANGABAD.—T. M. Keshava of the South-western Circle of the Survey, in the course of his exploration, collected Middle Palaeolithic tools, scrapers and points at Sultanpur, on the bank of the rivulet Nagjhari. The tools are made on agate, chalcedony and green jasper.

49. EXCAVATION AT DAULATABAD, DISTRICT AURANGABAD.—In continuation of the excavation conducted during the last two seasons a joint team of the Deccan College Post graduate and Research Institute, Bharat Itihas Sanshodhak Mandal, Pune, and the Marathawada University, Aurangabad, carried out excavation of the house-complex near the Delhi gate. An area of 1500 sq. m, adjacent to the one excavated last year, was selected for digging. A massive basement, built of stone and mortar, supported a number of rooms in brick and timber. A stone-built house nearby had a privy, constructed of large blocks of stone, with water-channels in the floor. A strong rampart-like wall with a row of arched cells on the inner side flanked the western side of this complex.

The minor antiquities include: a large number of iron arrowheads, horse-trappings and other implements; glass bangles and sherds of the Celadon Ware, two with Chinese characters on their base.

50. EXPLORATION IN DISTRICT BHANDARA.—S. N. Raghunath of the South-western Circle of the Survey located Late Stone Age sites at Urmed, Mul, Sadeswar, Gondpipri, Bori and Adyal.

The tools are short blades and scrapers on chalcedony and agate.

51. EXCAVATION AT NAGRA, DISTRICT BHANDARA.—S. B. Deo of the Deccan College Post graduate and Research Institute, Pune, and the Department of Archaeology and Museums, Government of Maharashtra *(1979-80,* p. 56; *1980-81,* p. 40), continued work at Nagra, where remains of a brick temple, going back to the Vakataka period, have been brought to light. No remains of the temple above the *jagati-like* platform was found. During the course of the work in the last two seasons, debris abutting the walls of the platform, facing the north, west and south was cleared. This year's work has made the outline of the huge structure, which measures 45-00 m (east-west) 26-50 m (north-south), clear. It has also been established that the monument was entered from the east, where a brick passage, 4-25 m wide, was traced. This was protected on the sides with balustrades. The balustrades are 2-65 m wide. As in the last season, the deposits yielded sherds of red ware and kaolin vessels. The red ware was mostly represented by small lamps, used probably during the worship in the temple.

52. EXPLORATION IN THE MANJRA VALLEY, DISTRICT BHIR.—Vijay Sathe and Rajinder Ganjoo of the Department of Archaeology, Deccan College Post-graduate and Research Institute, Pune, carried out exploration along the Manjra river between the villages Tadula and Wangdari. Calcreted moderately-sorted pebbly gravels are found resting on the Deccan Trap at most of the sites. These gravels represented old braided channels of the Manjra. The overlying formations are represented by silty sandy clay, brown to dark-brownish in colour. These deposits are fairly extensive in the area and represent a low-energy depositional environment, characteristic of ox-bow lakes associated with the old Manjra flood plain. The exploration yielded a good number of fossils which include those of *Hippopotamus* sp., *Cervus unicolor* and *Cervus duvauceli* for the first time from the valley, in addition to the fossils of equids, bovids, elephants and *Chelonia* already reported earlier. No cultural material could be collected from these sites. However, a few Mesolithic tools, fashioned on chert and chalcedony, were collected from a cultivated land on a nullah, about 3 km north-west of Parli, close to BHEL Thermal Plant.

53. EXPLORATION IN DISTRICT DHULE.—L. S. Rao of the South-western Circle of the Survey, during the course of exploration, noticed a chalcolithic site at Kholaj on the right bank of the Bun nullah, near Kharde Buduruk village, which yielded black-on-red and black-and-red wares. The vessels in the black-on-red ware are jars, basins, bowls and high-necked jars in medium thick fabric. The large number of well-fired sturdy rims painted in deep-black pigment bespeaks its affinity with Late Harappan element, whereas the black-and-red ware is represented by carinated bowls with everted rims and medium-thick jars with graffiti and white painted designs. He further discovered a site at Pandari, situated on the left bank of the river Tapi, which yielded sherds of the black-on-red ware and black-and-red ware, besides a tubular tracer bead of shell.

54. EXPLORATION AT NAGARDHAN, DISTRICT NAGPUR.—Chandrashekhar Gupta of the Department of Ancient Indian History, Culture and Archaeology, Nagpur University, carried

out exploration at and around Nagardhan in Tahsil Ramtek. He noticed stone images of Ganapati, Lajja-Gauri and other fragmentary stone sculptures, datable to the Vakataka period, at Hamlapuri and Nandapuri, situated at a distance of 2 km north-east and south-west respectively of Nagardhan.

55. EXCAVATION IN THE GHOD VALLEY AT INAMGAON, DISTRICT PUNE.—In continuation of last year's work *(1980-81,* pp. 41-42) G. L. Badam of the Department of Archaeology, Deccan College Post-graduate and Research Institute, Pune, assisted by Rajinder Ganjoo and Salahuddin, resumed the excavation of the fossiliferous site on the river Ghod, just opposite the chalcolithic mound at Inamgaon. The Pleistocene formations in the Ghod valley are fluvial in origin and rest unconformably on the Deccan Trap of Cretaceous-Eocene age. Two litho-units can generally be identified all along the Ghod—the basal sandy pebbly gravel, about 5 m thick, capped by a 5 to 10 m thick unit of red or yellow fine sands, silts and clay which is in turn overlain by black cotton soil (about a metre thick) of early Holocene age.

The excavation yielded for the first time *Leptobos,* represented by basicranial part of the skull with two horns intact. The horns are 72-5 cm in length each and 80 cm apart at the tips. The girth of each horn at the base, centre and tip is 37-5 cm, 30 cm and 15 cm respectively. The horns are longitudinally striated and the section profile varies from ellipsoid near the base to round near the tip. The fossil was excavated from within the yellow silt and sandy horizon which also yielded the Upper Palaeolithic tools in association with fossils of bovids. The tools comprise blades, scrapers, nodules and cores made on chert.

The basal unit of sandy pebbly gravel yielded Middle Palaeolithic tools, mostly consisting of scrapers and a few cores made on jasper and chert. Fossils of *BosjBubalus* and *Hippopotamus* were collected from this horizon. In addition, a right ramus of *Sus* species was collected, for the first time in the valley, from this gravelly horizon.

A representative collection of bovids, cervids and equids was also made from the re-deposited beds of sandy pebbly gravel, scattered along the river banks.

Inamgaon is one of the richest sites in the Deccan which has yielded a large number of animal fossils alongwith Upper Palaeolithic tools dating between 20,000 to 12,000 BP.

56. EXCAVATION AT INAMGAON, DISTRICT PUNE.—In continuation of last year's *(1980-81,* p. 41) work on the most extensive habitational area at the site (INM-I), the excavation under the planning of H. D. Sankalia was carried out by M. K. Dhavalikar and Z. A. Ansari with assistance from Y. S. Rasar, V. G. Vishwasrao, V. S. Shinde and U. R. Moorthy of the Deccan College Post-graduate and Research Institute, Pune. The excavation was fully funded by the University Grants Commission. This year's work was confined mostly to the late levels of Period III (Late Jorwe, *c.* 1000-700 BC), although a few houses of the lower levels of the same period and one house of Period II (Early Jorwe, *c,* 1400-1000 BC) were also exposed.

The house belonging to Period II (H no 119) (pl. XIXA) was considerably large (8.45 X 5.15 m) and was rectangular on plan with a well-made courtyard all around. The extant mud walls were 30 cm high, and their original height, as can be made out from fallen debris, would have been about 1 m. There were a number of large post-holes in the wall, and the interior of the house was partitioned by a dwarf wall. The entrance to the house was probably provided on the south, and the cattle-shed was also located on the south and west as is suggested by the evidence of nitrogen content from the soil in that area. Inside the house there was a human burial (no l98) (pl. XIX B) of a teenager, which was deposited in an unbaked four-legged urn which, in its turn, was placed in another similar urn and the entire burial was carefully placed in a pit specially dug for the purpose. In this connection it may be recalled that a similar four-legged urn-burial was found in a house which was located in the adjoining area to the south. It is, therefore, likely that both these houses probably form part of one complex or that the

house exposed this year was that of a close relation of the other, since the mode of burials is the same in both the cases. Of the antiquities recovered from this house, those which are worth mentioning are the remains of a four-legged clay urn in the south-east corner, an antler pick, which may have been used for mining purposes as in Neolithic Europe, and a terracotta figure of a crocodile. The last-mentioned object is indeed significant and may perhaps be associated with the religious beliefs of the people. It may be stated that bones of crocodile have been found in the Late Jorwe levels.

A number of houses of Period III (Late Jorwe) were unearthed. Of these, those from the earlier levels are either rectangular or circular, the latter being found in a cluster of three huts. A few child and adult burials have also been exposed. Of these, the most important is that of a child (burial no 176) which is of the usual twin-urn variety. Inside, the skeleton of the child was found to be wearing two necklaces, one of spherical copper beads and the other of marine shells, which may have been imported from the western coast. Another important burial (pl. XX A) was that of an adult, which contained a skeleton completely wrapped in grass. Yet another contained two skeletons, one male and the other a female.

A few houses in the upper levels of Late Jorwe were laid bare. One of them was roughly triangular on plan. Its walls were raised about 25 cm high and the floor was sunken. Inside, there was a skeleton of an adult (pl. XX B) which was placed on the house-floor in a crouching posture and earth was heaped over it. This is by far the only example of its kind, because the usual burial method was to bury the dead in a pit. But in this case the pit does not seem to have been necessary, as the floor was sunken. An antler pick was found near the legs of the skeleton. Another house was roughly trapezoidal, which contained a huge handmade storage-jar in the south-west corner. There were also circular and rectangular houses belonging to the upper levels of Late Jorwe. A distinguishing feature of all these houses is that the floors were not well-made as was the case with the houses of the earlier period.

It is noteworthy that the quantity of charred grains decreases in the upper levels of Late Jorwe, but at the same time the number of sheep and goat bones increases considerably, suggesting a shift towards sheep/goat pastoralism. It is highly probable that the people were slowly reverting to semi-nomadic life, as is evident from the house-plans and the house floors, as also the proportionate increase in the sheep/goat bones.

57. EXCAVATION AT KHAIRWADA, DISTRICT WARDHA.—The Department of Archaeology, Deccan College Post-graduate and Research Institute, Pune, under S. B. Deo, and the Department of Archaeology and Museums, Government of Maharashtra, under A. P. Jamkhedkar, jointly carried out excavations at Khairwada on the right bank of the river Dhan, about 118 km west of Nagpur. The site is unique in as much as it has about 1400 megalithic stone-circles and habitational deposit strewn over an area of nearly 13 hectars. The megaliths were first noticed in 1869 and a few were excavated by Carey, the then Executive Engineer. He reported the find of iron and copper objects and a few human bones. However, there is no mention of habitational deposits.

As a part of the project on megaliths in Vidarbha, which has been in execution since 1968, the site of Khairwada was exhaustively surveyed and plotted in 1980-81 and excavations were carried out in the habitation area as well as in the cemetery (stone-circles) with a view to ascertaining cultural concordance between the habitation and the burials. The cemetery area was divided into three sectors, viz., 1 to the east of the habitation, 2 in the Reserve Forest to the north of the habitation, and 3 on the other bank of the river Dham and to the south-west of the habitation. The habitational area, though very much disturbed on account of the present Gond village on it as well as due to the river erosion and agricultural operations, area close to the east of the village school was undisturbed with a deposit of about 3.10 m.

The stone-circles were found to have been of two types: (i) those with pebble and clay falling within a circle of boulders and (ii) those with loose pebbles piled up without use of clay within a circle of boulders. In the latter type, the top of the pebble-filling was deliberately depressed. A trench, measuring 4x3 m, was laid in the habitation area. The total deposit was 3-10 m and the first occupation took place right on the black cotton soil. Layers 7, 6 and 5 were fully megalithic and yielded pottery similar in fabric and typology to that encountered in the burials. It could be categorized into four main fabrics, viz., the Black-and-red, the micaceous red, the burnished black and (in layer 5) black-on-red. It thus confirmed the ceramic data encountered at other megalithic sites in Vidarbha, as for instance, Takalghat, Khapa, Naikund, Mahurjhari, etc. The typical shapes in the Black-and-red Ware are rimless bowls, bowls with concoidal base, squat stands; those in the burnished black ware are lids or covers with looped hold, lids with knobbed or bud-like hold and squat stands; and the vessels in the micaceous red ware included globular pots with funnel mouth, basins, deep bowls and jars with constricted neck. The painted black-on-red was mostly restricted to layer 5 upwards pertaining to the later phase of the Megalithic habitation. The sherds belonged mostly to globular pots, externally red-slipped and bearing mostly mesh-patterns. Besides pottery, these layers yielded copper bangles and flat rectangular axes of iron with cross-ring fasteners. Settled mode of habitation was evinced by floors of lime plaster, circular post-holes and saddle and legged querns.

Layer 4 shows a transition from the Megalithic to early historic (i.e. Satavahana), as the deposits of this layer yielded, alongwith Megalithic thick Black-and-red Ware, thicker black-and-red ware with typical early historic shapes as found at Paunar, Kaundinyapura, Nasik and Nevasa. Alongwith the axe with cross fasteners, the layer yielded a large number of iron nails, knife-blades and beads of semi-precious stones. Layer 3 showed a dominance of late Satavahana ceramic traditions and lesser turn out of Megalithic Black-and-red Ware and micaceous red ware. Layer 2 was medieval, as attested to by Muslim coins, fragments of Celadon and mica-coated or mica-dusted ware.

The stone-circles in Sectors I and II gave all the ceramic data as in the habita-tional deposits in layers 7, 6 and 5, besides human teeth, fragmentary long bones, iron axes with cross-ring fasteners, iron blades, iron hoes and bird-finials of copper lids, besides teeth and bones of horses. In the stone-circles with pebble and clay fillings, there was exposed another smaller circle of boulders in the centre, below which human and horse remains were encountered. In the Megaliths having loose pebble heaps with a central depression, there was relatively greater occurrence of coarse red ware alongwith micaceous red ware, though the typology of iron and copper artefacts remains unchanged. These seem to indicate a later phase of Megalithic burials (pl. XXI A).

Khairwada thus gave evidence of an earlier and later phases within the Megalithic culture as also its transformation or contact with the early historic period. Carbon samples from practically all the habitational layers would define the chronological range of the Megalithic settlement at Khairwada.

MEGHALAYA

58. EXPLORATION IN THE GANOL VALLEY, GARO HILLS.—T. C. Sharma of the Department of Anthropology, Gauhati University, assisted by research scholars, Minarva Sonowal, Kaveri Deka and Dwijendra Nath Kakati, carried out explorations in the Ganol river-valley of central Garo Hills and discovered two Palaeolithic sites at Ganol Abri and a neolithic site at Rongru Abri. GanoAbsi (Lat 25°34'N; Long 90°16'E) is located on the top terrace on the right bank of the river Ganol, 650 m above MSL. It falls within the shifting cultivation field of the Selbalgiri village . Ganol is one of the major rivers in the Garo Hills and has several terraces. The site

was exposed due to erosion-gully of the terrace. A large number of tools are thus exposed on the surface, while many of them are still embedded in the thick silt of the terrace, formed on the outcrop of a huge dyke of doleritic basalt. The weathered blocks of the dyke were utilized by the Stone Age man for the manufacturing of different types of tools. The presence of large quantities of cores, waste flakes and unfinished tools suggests that it is a factory site. There are huge cores of dolerite which are difficult to lift. These were used for detaching large flakes for making choppers, cleavers and handaxes. There are free flake cores, prepared Levalloisian cores and fluted blade cores. Altogether six hundred and forty-seven stone tools from the exposed surface were collected. All tools are made of rock from doleritic dyke, the tools are heavily weathered and patinated. The assemblage includes three hundred fourteen regular tools, two hundred nine simple flakes, thirty-four cores, twenty chunks, forty-six fragmentary tools and twenty-four small chips. The regular tools include choppers (3.20 per cent), handaxes, (6.40 per cent), cleavers (15.60 per cent), scrapers (45.60 per cent), points (26.24 per cent), and blade-flakes (25.30 per cent). There is also a small quantity of chipped celts (2.40 percent). Ground and polished neolithic celts are conspicuously absent. The site appears to have yielded a mixed assemblage of Lower, Middle and Upper Palaeolithic tools, besides a small proportion of early neolithic material.

Muksak Abri is located about 2 km towards the north-east of Ganol Abri on the top terrace of the river Rongram, which is a tributary of the Ganol. The site was exposed during the construction of a road. During the exploration, only a small number of the exposed tools were collected. All the tools are weathered and heavily patinated. These are made on doleritic basalt. The tool assemblage includes choppers (8.25 per cent), handaxes (8.73 per cent), cleavers (7.76 per cent), scrapers (32.55 per cent), points (41.75 percent), blade-flakes (31.19 percent), and twenty-six cores, in addition to a huge quantity of simple flakes, broken tools and chips. Rongru Abri is located on a sub-Recent terrace of the Rongram river further downstream, about 3 km towards the west from Mukshak Abri. The site yielded a large quantity of ground and polished celts along with crude handmade pottery. A few chipped celts and scrapers have also been found on the bed of the dry gullies cut through the thick silt of the terrace.

ORISSA

59. EXPLORATION IN DISTRICT CUTTACK.—G. N. Srivastava of the Eastern Circle of the Survey, in the course of his exploration, noticed the following sites.

Village [site	*Cultural assemblage*
Amaravati	Medieval
Asia	Brick structural remains
Bantala	Medieval temple
Chandital	Medieval temple
Chhatia	Sculptures
Darpankhas	Fort, medieval temple and sculptures
Gargali	Sculptures
Gurujang	Sculptures
Haripur	Medieval site
Karei	Medieval temple
Manduka	Mosque and sculptures
Manguli	Medieval temple and sculptures
Rasiknagar	Sculptures
Sasilo	Sculptures

60. EXPLORATIONS IN DISTRICT PHULBANI.—During the course of exploration, in the area lying between the rivers Bagh and Khadag (tributaries of the Mahanadi and Tel respectively), S. B. Ota, research scholar of the Daccan College Post-graduate and Research Institute, Pune, discovered Lower Palaeolithic (pebble-tool industry) open-air sites at Gurvelipadar, Kankolidungri, Rengali hill, Kantamal, Sunadei hill and Barpadar. Except the site of Kantamal, which is located on the river Tel, all are foothill sites. The artefacts were found in red soil at depths ranging between 2 to 4 m from the top surface. This red soil was found in patches in the foothill zone as well as along the river banks; it is most probably of colluvial origin. All the artefacts are on quartzitic pebbles and cobbles. Cores, flakes, hammers, unifacial and bifacial choppers constitute the major types.

Microlithic sites were found at Mohuli, Sanagambhira Ghat, Kanapa-Gochhapara Ghat, Kandhariapara, Panchra reserve forest, Mundipadar, locations near Jammunadi, Sibilaguda, Kankoli-dungri, Gurvelipadar, Malpada Ghat, Kantamal and Shrimal. Apart from these large sites, a number of small sites have been located at Asurgarh, Pauka, Benamunda, Jhankarpada, Pudamarghata, Kasurbandh and Kurumpadar. All these are open-air sites, located either on granitic ridges or on the top surface of the red soil. The majority of these sites lie close to the banks of the rivers Bagh and Tel. Pebbles of chert, chalcedony and fine-grained quartzite formed the raw material for this industry; quartz crystals were also used in some cases.

One single celt of cherty material was found at Malpada Ghat near the village Shrimal. It was collected from the top surface of the red soil lying on the right bank of the river Tel. This find is of importance in that it is the first evidence of Neolithic culture in the district.

The explorations also brought to light fourteen historical sites at Kurumpadar and Jamtangi on the Mahanadi and Ratakhandi, Komghat (two sites), Tilaimal, Gumharipadar, Deuldungri, Kantamal, Rekdol (two sites), Jhonkarpara, Gidhamal and Barpadar on the Tel. All these sites yielded red ware and in a few cases, burnt-brick structures were noted. All these sites show clear evidence of river erosion. A fossilized antler piece (probably of the species *Axis Axis)* was found near the Asurgarh historical mound at Manmunda; it probably belongs to the Upper Pleistocene. Remains of temples were noted at Komghat and Deuli.

61. EXPLORATION IN DISTRICT PURI.—During the course of exploration in the area under Balipatna Police Station, Bhubaneswar Tahsil, S. B. Ota and S. C. Nanda, research scholars of the Deccan College Post-graduate and Research Institute, Pune, discovered three historical mounds at Dengahuda, Asurikuda and Parbati near Danapada, Taraboi and Panikata villages respectively. The pottery obtained from these sites included red, grey and red-slipped wares; bowls, platters, jars, vessels were the main types. Exposed burnt-brick structures were noticed at Dengahuda and Parbati.

PUNJAB

62. EXPLORATION IN DISTRICT LUDHIANA.—During the course of Village-to-Village Survey m Tahsil Ludhiana, Jagraon and Samarala of the district, J. M. Thapar under the guidance of S. N. Jaiswal of the North-western Circle of the Survey, noticed antiquarian remains at five villages which offer a range of cultures from the Harappan to the late medieval periods. The sites yielding remains of the cultural assemblages are given in the table.

Taluk	*Village/site*	*Cultural assemblage*
Ludhiana	Gungrama (Lat 30°50'N, Long 75°43' E)	Mound 200 X 100 m) with a deposit of 4 m: early and late medieval

Taluk	*Village/site*	*Cultural assemblage*
Ludhiana	Kanti Kalan (Lat 30°42' N, Long 75°40' E)	Mound (150x50 m) with a deposit of 4 m: Kushana, Rangmahal, early and late medieval and terracotta objects
-do-	Raipur Qila (Lat 30°50' N, Long 74°48' E)	Early medieval fort
Jagraon	Raikot (Lat 30°37' N, Long 75°39' E)	Mound (300 X 200 m) with deposit of 4 m: Kushana, Rangmahal, early and late medieval and terracotta objects
Samarala	Rupalon (Lat 31°47' N, Long 76°7' E)	Mound (400 X 200 m) with a deposit of 3 in: Harappan, early medieval and terracotta objects

RAJASTHAN

63. EXPLORATION IN DISTRICT ALWAR.—A. K. Khanna of Delhi Circle of the Survey discovered sites of the Kushana period" at Badla, Bajora, Goth, Hodaheli, Khelpur, Nandwari and Parbeni, apart from sites of the Rangmahal affiliation at Amarpur, Dungarawara, Googrod and Kodiya in the Rajgarh tahsil.

64. EXPLORATION IN DISTRICT BHARATPUR.—In continuation of last year's work *(1980-81,* p. 55), B. S. Negi of the Delhi Circle of the Survey discovered Painted Grey Ware in association with grey ware, red ware and black-slipped ware at Nandera, Naunera, Pai and Sahera. He also discovered historical sites at Ainchwara, Angrawali, Badipur, Bamanwari, Gamri, Ghaghwari, Gundgaon, Hultana, Karmuka, Khera-Laduka, Khoontpuri, Lalpur, Natwari, Naugaon, Ramph, Sablanna and Saumka in the Kaman tahsil. The site of Sahera yielded sprinklers, lids etc., in red ware. A Muslim coin was found at Nandera.

65. EXPLORATION IN DISTRICT JAIPUR.—The Art Survey Branch of the Department of Archaeology and Museums, Government of Rajasthan, under the supervision of V. S. Srivastava, noticed mural paintings in the cenotaphs at Bhaupura. It contains paintings, in the interior as well as on the exterior, which stylistically belong to the period of Jahangir (AD 1605-27). Besides the religious themes (Simhavahani Durga, Dadhimanthana, Goraksha-*panthi,* Tantric themes etc.), the depiction of contemporary life also finds a place therein. The paintings in the cenotaph at Bhaupura seem to be contemporaneous with those found in the cenotaph of Maharaja Mansingh and some illustrations on the walls of the palaces ascribed to him at Amber. The paintings in the cenotaph at Amber were executed in vs 1720 (AD 1663) during the reign of Bhausingh.

The village of Bhaupura, as its name connotes, was closely associated with this prince. Unfortunately, it is not known in whose memory this cenotaph at Bhaupura was erected, though the monument contains a few later painted inscriptions dated vs 1741 (AD 1684). The colossal step-well near the cenotaph contains the bilingual inscription dated vs 1694 (AD 1637) recording its construction by the male nurse Chatra and (his wife?), the female-nurse, Lakmi (Lakshmi of (Mirza Raja) Jai Singh, the ruler of Amber. These murals have the impact of the folk element as well. The mural paintings in the Sheeshmahal apartment of the *garh* (fort) Samod are fine specimens of the paintings in the Jaipur style of the later half of eighteenth century AD. These

fine art creations belong to the reign of Sheosingh, the local chieftain, who got them executed in VS 1804 (AD 1747).

66. EXPLORATION AT KISHAN BILAS AND KAPILDHARA, DISTRICT KOTA.—Narayan Vyas and S. C. Saran, accompanied by M. M. Hadapad and R. J. Indora of the Western Circle of the Survey, explored the banks of the river Bilas, a tributary of the Parvati, and brought to light one hundred and twenty-eight rock-shelters (pl. XXI B), of which thirty-six contain paintings. While some of these paintings could perhaps be of the prehistoric period, others are of historical times. Most of the paintings (pls. XXII A and B) are drawn on the wall-surface and projected ceilings of the rock-shelters. The paintings are executed in monochrome, in red and dark-red colour, depicting bear, monkey, deer, rhinoceros, dog, ox, buffalo, horse, fox, scorpion, camel, antelope, elephant, humped bull and peacock. There are also paintings representing the sun and the moon, circle, square, intersecting circles, dancing human figures, man with an arrow, man with a bow and an arrow, running animals, male drummer, standing male wearing mask, etc. Particularly noteworthy is a painted single-lined Brahmi inscription, assignable to *circa* second century BG.

A large number of Palaeolithic implements comprising handaxes and cleavers and Mesolithic tools like triangles, trapezes, lunates and blades were also collected along the banks of the river Bilas.

On the right bank of the river in the Kishan Bilas village, over the upgraded slope of the hillock, extensive remains of a medieval town including Brahmanical and Jaina temples and remains of a fort-wall were also noticed. The roads and streets with houses on either sides and fortification indicate that Kishan Bilas was a planned settlement.

Kapildhara is situated 17 km south-east of the village Kishan Bilas, on the bank of the river Barni, a tributary of the Parvati. On the right bank of the river, fifty-eight rock-shelters were documented; of these seventeen contain paintings. The paintings are generally similar to those in the Kishan Bilas rock-shelters.

On the banks of the river Barni crude handaxes and cleavers were also collected. On the basis of lithic implements and paintings, the site may be considered to have been inhabited by the early man up to the historical times.

67. EXCAVATION AT DIDWANA, DISTRICT NAGAUR.—In continuation of last year's *{1980-81,* pp. 57-63) work on the project 'Early man and his environment in the north-west India with special reference to Luni basin in Rajasthan', a team consisting of V. N. Misra, S. N. Rajaguru, M. D. Kajale, D. R. Raju, C. Gaillard, Makkhan Lai, Hema Raghavan and Hema Abhyankar of the Deccan College Post-graduate and Research Institute, Pune, carried out further explora tion and excavation in and around Didwana. The objectives of the excavation were : (i) to explore a detailed stratigraphy of dune building phases; (ii) to ascertain the relationship between aeolian and fluvial deposits; (iii) to locate archaeological material within the dune; and (iv) to find out the nature of the evolution of the stone industries from Amarpura to Didwana Forma tion. A trench 30 X 2 m, was dug to a depth of 16-5 m, in the fossil sand-dune in the eastern cliff of the Bangur canal at 16 R point on the western margin of Didwana salt lake. The lithological units exposed by this excavation are as under :

Litho Unit depth below surface (in m)	*Description of Lithological Unit*	*Approximate age and cultural contents*
IA 0-4.90	Brown well-sorted, weakly pedogenized sand, with distinct development of carbonate pellets, root casts in lower part	Microliths on top 16,000 years BP(TL date)

Litho Unit depth below surface (in m)	*Description of Lithological Unit*	*Approximate age and cultural contents*
	grades to	
IB 4-90-4-95	Colluvial gravel, rich in slate and schist	
IIA 4-95-5-00	Intra-sedimentary kankar bed	
	grades to	
IIB	Yellowish-brown moderately-pedogenized sand with concentration of kankar concretions (crudely bedded) at 5-45-5-50 m, 5-70-5-75 m, and 6-70-6-75 m, and 6-70-6-75 m below the surface	Upper Palaeolithic tools 30,000 years BP (C 14 date)
	grades to	
IIC 6-75-7-35	Pale-brown sand, rich in carbonate concretions and root casts	
	grades to	
IID 7-35-8-05	Pale-brown sand with sparsely-distributed carbonate concretions	
	sharp contact to	
IIIA 8-05-8-10	Intra-sedimentary kankar bed	
	grades to	
IIIB 8-10-8-60	Very pale brown sand, poor in carbonate concretions	Late Middle Palaeolithic tools
	sharp contact to	
IIIC 8-60-8-70	Intra-sedimentary kankar bed	
	grades to	
IIID	Pale-brown sand, almost devoid of carbonate concretions	Between 40,000—70,000 years BP
	sharp contact to	
III E 8-90-9-50	Light-brown sand, rich in hard crystalline kankar nodules (6-8 cm across)	
III F 9-50-13-70	Yellowish-brown sand with sparsely dispersed kankar nodules	
	sharp contact to	
IIIG 13-13-70-12 .85	Intra-sedimentary kankar bed (massive)	
	grades to	
IIIH	Yellowish-brown sand with sparsely-dispersed karkar nodules	
	sharp contact to	
	Intra-sedimentary kankar bed (massive)	
III I 14-20-14-30	grades to	
III J 14-30-16-50	Yellowish-brown sand with sparsely-dispersed kankar nodules	

The sand profile exposed at 16 R shows that there are at least three major phases of aeolian sedimentation as represented by Litho Units I, II and III. Each fossil sand sheet or dune is separated by weak-to-moderately developed palaeosol of pedocalio type. Degree of crystallanity in kankar and ferruginization of sands increases linearly with the age of sediments. Thus, Unit III is distinctly ferruginized and contains hard kankar nodules, while Unit II contains only soft pellety carbonates. Full soil profile is observed only in Unit I, while truncated profiles seem to be present in Units II and III. Field examination shows mobility of carbonates, both downward and upward. Intra-sedimentary kankar beds are probably the result of ground-water movement and are partly pedogenic and partly ground-water type. Aeolian sands seem to have undergone cumulative soil profile development in which sand accumulation had kept pace with pedogenesis. It is likely that these sands have developed slowly in the presence of vegetation and that the source of sands is from the nearby defunct floodplains of Middle Pleistocene age. Laboratory studies of dune-sands and kankars will help in understanding environmental changes during Late Pleistocene.

Recently Litho Units I and II have been approximately dated to 16,000 years BP and 30,000 years BP by Thermoluminiscence and Carbon 14 methods of dating, by the Physical Research Laboratory, Ahmadabad. By extrapolation Litho Unit III is tentatively dated to about 6000-7,000 years BP. For the first time in India, it has been possible to establish the initiation of dune formation on the eastern margin of the Thar desert to about the beginning of the Last Glacial period. It seems that during the Last Glacial period the present semi-arid parts of the Thar experienced arid climatic conditions, probably due to weakening of southwesterly monsoons. The presence of stone tools within sands shows that early man occupied this region during relatively wetter climatic phases (as indicated by carbonate mobilization and segregation) corresponding to interstandial phases of the Last Glacial period.

These observations get firm support from the studies of textural and mineralogical characters of sediments exposed down to a depth of about 6.5 m in the salt lake of Didwana. It is observed that the lake was hypersaline around 20,000 years BP, saline to brackish between 13,000 and 6,500 years BP and was carrying fresh water between 6,500 and 4,500 years BP. Attempts are being made to establish relationship between fluvial (Amarpura Formation) and aeolian (Didwana I Formation) and lacustral (Didwana II Formation) deposits around Didwana.

Stone tools were found at two horizons between 5-40 and 6-00 m (Litho Unit II) and between 8.50 and 12.10 m (Litho Unit III). The assemblage from Litho Unit II belongs to Upper Palaeolithic period and that from Unit III to Late Middle Palaeolithic. A small (9.5 cm long) cordiform handaxe showing a highly-evolved craftsmanship was discovered in Litho Unit II which has been approximately dated to 30,000 years BP by Carbon 14 method. Though handaxes of such recent age have not been reported in India earlier, they are known to occur in the Mousterian of Acheulian tradition in Western Europe around *c.* 35,000 years BP. Whether such handaxes were in regular use in the.Didwana region up to the time suggested by the solitary C 14 date can be confirmed only if more specimens are recovered in a larger excavation.

Meanwhile it needs to be pointed out that it is for the first time that stratified pre-Mesolithic cultural material has been found in the body of a dune in a regular excavation. This discovery necessitates a revision of our earlier statement that the area around Didwana was environmentally not conducive to human occupation during the terminal Pleistocene.

68. EXCAVATION AT SINGI-TALAV, DISTRICT NAGAUR.—In continuation of last year's work *(1980-81,* pp. 57-63), a team of the Deccan College Post-graduate and Research Institute, Pune, headed by V. N. Misra, carried out excavation at Singi-Talav, situated at a distance of 2 km west of Didwana. With a view to ascertaining the nature of occupation by carefully plotting the precise location of artefacts and associated remains, two trenches, SGT 1 and SGT 2, were

sunk. The trenches were divided into 4 zones of 4 m in length from north to south and numbered A to D from west to east. Each zone was further divided into 1 m squares which were numbered 1, 2, 3 and 4 from north to south.

SGT 1 is an extension of the last year's trench southwards. The stratigraphy is as follows:

Layer	*Depth below surface in cm*	*Description of rock unit*
1	0-8	Brown silty sand sharp contact to
2	8-25	Greyish-clayey silt sharp contact to
3	25-80	Greyish-green strongly-kankarized clayey loam grades to
4	80-90	Kankar crust or calcrete

A total of two hundred sixty-four artefacts were recovered. These consist of one hundred fifty-eight flakes (59-85 per cent), seventy-three debris (27-65 per cent), thirteen cores (4-92 per cent), nine manuports (3-41 per cent), three choppers (1-14 per cent), three flake tools (1-14 per cent), two handaxes (0-76 per cent), two polyhedrons (0-76 per cent) and one cleaver (0-38 per cent). The raw material for the tools is quartzite (87-4 per cent) of different shades———----one hundred and five grey (38-60 per cent), eighty-one white (29-78 per cent), fifty-two brown (19-12 per cent), and twenty-one vein quartz (7-72 per cent). In addition, there were 5 quartz crystals (1-84 per cent), showing some deliberate modification. Even though they may not be called artefacts in a strict sense, they certainly were brought to the site by man for their curiosity or aesthetic value. There was one hammerstone and eight large pieces of shale. Although the function of the shale pieces is not clear, their size precludes flowing water as an agency for bringing them to the site under the low energy flow represented by very fine sedimentation. A few water-worn split cobbles (quartzite) were also found. These were brought to the site from a river-bed which must have existed then within a reasonable distance from the site.

Vertical distribution of artefacts shows three levels of concentration of 28 cm, 43 cm and 58 cm, respectively from the surface. From a preliminary analysis, it appears that the main Acheulian horizon is between 55 and 60 cm. Outside the excavation, in the exposed *murud* quarry sections also a number of artefacts were found at this depth. Horizontal distribution of artefacts suggests that their density is higher in zones B and C than in A and D.

Soil samples were collected from each square (five samples each) at 60 cm below surface and subjected to a qualitative rapid test for phosphorus with Ammonium Molibdate and Ascorbic Acid. This test shows the presence of phosphorus in a quantity that could be produced only by human habitation. Quantitative analysis is under progress to determine the exact amount of phosphorus in each square.

The trench SGT 2 was laid 28 m north-west of SGT 1 to ascertain the nature of habitation and variability in other parts of the site. However, except for a few flakes and debris, this trench was sterile. The results of these two diggings confirm the prolonged observations made during quarrying operations in the Singi-Talav deposit, namely, that stone artefacts in the calcareous loam occur in localized clusters and large areas of the deposits are either poor or totally devoid of cultural material. This leads to the conclusion that the clustering of artefacts can only be due to human activity. Had natural agencies been responsible for the dispersal of artefacts, the latter would have been distributed more or less randomly throughout the deposit.

At the same time it should be stressed that the presence of artefact in clusters at numerous locales in the 2 sq km area of the Singi-Talav depression and in the dug-out of several tanks and the Bangur canal shows that a large number of human groups must have inhabited the area.

69. EXPLORATIONS IN DISTRICT PALI.—In the course of explorations, R. Pathak of the Western Circle of the Survey located the following sites:

Taluk	*Village/site*	*Cultural assemblage*
Bali	Amaliya	Inscription, step-well and medieval sculptures
	Bamania	Inscription and *sati-stone*
	Barkana	Medieval Jaina temple, inscription and *sati-stone*
	Barwa	Medieval Lakshmi-Narayana and Siva temples, inscription and *sati-stone*
	Belar Bera	Remains of medieval Jaina and Siva temples, step-well, raft-stone and inscription
	Bhadund	Medieval Jaina and Vishnu temples, inscription and *sati-stone*
	Bhatund	Medieval Varaha and Siva temples, inscription, step-well, sculptures and *sati-stone*
	Bijapur	Medieval Siva temple and remains, sculptures including an image of Kubera of the fourth century AD, inscription and *sati-stone*
	Bilaspur	Medieval Jaina and Siva temples, inscription, *baoli* and *sati-stone*
	Boya	Medieval coins and remains, inscription, step-well and *sati-stone*
	Chamundari	Medieval Siva and Jaina temples with paintings and inscription
	Dantiwara	Medieval Mahishasuramardini temple, inscription and *sati-stone*
	Hirola	Medieval Siva temple, sculptures, inscription and *sati-stone*
	Junabera	Medieval Siva temple, sculptures, inscription, *baoli* and *sati*-stone
	Kot	Medieval Jaina and Siva temples and remains and *baoli*
	Lalraj	Medieval Siva temple, inscription and *baoli*
	Laskagurha	Inscription and *sati-stone*
	Lunawa	Medieval Siva temples and remains
	Lundara	Medieval Siva temple and remains, inscription and .raft-stone
	Malnu	Medieval Vishnu temple and sculptures, inscription and *sati-stone*
	Mundara	Medieval Jaina temple and remains Medieval Jaina, Chamunda and Siva temples, inscription and *sati-stone*
	Nana	Medieval Siva temple and sculptures, inscription, step-well and *sati*-stone
	Punaria	Medieval remains, inscription and *sati*-stone
	Sena	Medieval remains
	Sewari	Medieval Jaina temples and remains, sculptures, inscription, step-well and *sati-stone*

Taluk	*Village/site*	*Cultural assemblage*
Bali	Sheotalao	Medieval Siva temple, inscription and *sati-stone*
	Sokra	Medieval Jaina temple, inscription and *sati-stone*
Desuri	Bijowa	Medieval temple and remains, inscription, step-well and *sati-stone*
	Dhalop	Medieval Brahma temple and remains, inscription and *sati-stone*
	Jona	Medieval remains
	Mado	Medieval Siva temple, inscription and *sati-stone*
	Morkha	Medieval remains, inscription and *sati-stone*
	Nadol	Inscription, step-well and *sati-stone*
	Narlai	Fort, inscription, step-well and .sttiz'-stone
	Rajpura	Medieval Jaina temple and inscription
	Sadri	Medieval temple, inscription, step-well and *sati-stone*
	Sobhawa	Medieval remains
	Soda	Medieval Jaina temple, remains, inscription and *sati-stone*
	Somesar	Medieval Jaina and Siva temples and remains, inscription, step-well and *sati-stone*

70. EXCAVATION AT GANESHWAR, DISTRICT SIKAR.—Vijai Kumar of the Department of Archaeology and Museums, Government of Rajasthan, carried out excavation at Ganeshwar (lat 27°40' N, long 75°51'30" E) located at the source of the river Kantali which used to join the river Drishadvati near Sothi-Bhadra on the north. The excavations have brought to light the deposit of one homogenous culture of Copper Age which is marked by three structural phases. The total habitational deposit at the site is about 3.65 m thick. Copper objects, microliths and pottery were found throughout the deposit. However, the most significant feature of the excavation was the discovery of a large number of copper objects. The assemblage includes weapons like arrowheads and spearheads, implements in the form of chisels and fish-hooks and ornaments like rings, hair-pins and bangles.

The Department had earlier found fifty-eight socketless flat copper axes and two barbed arrowheads which alone gave an evidence of developed copper industry at the site. It is possible that this local industry exploited copper ore available within a radius of 20 to 30 km from Ganeshwar. In fact, the existence of this valuable metal in the form of extensive chalco-pyrite copper ore deposit in the region appears to have attracted the first settlers in the north eastern Rajasthan. This was a further inducement for their continued stay there. As evident from the excavations, the site appears to have been damaged by floods,: as a protective measure people had raised three stone platforms in three successive phases. As a result of systematic explorations in the region this year, the Department has brought to light dozens of Copper Age sites in the vicinity of Ganeshwar.

Microliths, discovered here, represent a highly evolved geometric industry, the principal tool-types being blunted-back blades, obliquely-blunted blades, lunates, triangles, trapezes and points. Flakes and cores are also available. The raw materials employed for the industry are quartz, chert, garnet, chalcedony and occasionally jasper. These were obtained in the form of nodules from veins in the gneissic formations and limestone outcrops. The river-bed at the place hardly contains any pebble suitable for the manufacture of microliths.

The pottery represented by Jodhpura O.C.P. culture includes a variety of shapes. These may be classified into six groups: (i) storage jars; (ii) vases; (iii) basins; (iv) bowls; (v) lids; and

(vi) miniature pots. Of these the vases in which vertical handles are attached between the rim and the shoulder deserve special mention. Ganeshwar is probably the first site in the region to have yielded a large number of painted O.C.P. sherds. It has considerably increased our knowledge about the technique and variety of painted motifs. The paintings are normally on the rim, neck and shoulder; in a few cases alone the painting extends below the belly also. The designs include a thick band on the neck, thin parallel lines on the shoulders, a horizontal band between two wavy lines, oblique parallel lines, a crescentic comb pattern etc. The incised pottery also occurs in large number with the lines deeper and longer. The designs include oblique strokes on cords, crescent-like notches, deep dashes, oblique and straight lines and check pattern. The significant feature of Ganeshwar O.C.P. is the occurrence of graffiitti marks on potsherds. These include many symbols like trident, hatched quadrangle, ladder etc. Included among other finds are several stone beads, querns, mullers, pestles, bone beads and spike etc. The O.C.P. from Ganeshwar bears a close affinity with the ceramic material from Jodhpura (District Jaipur) and is dated as early as 2500-2200 BC on C 14 determinations.

71. EXPLORATION IN DISTRICT SIKAR.—Vijai Kumar of the Department of Archaeology and Museums, Government of Rajasthan, carried out exploration in the district and discovered the following sites:

Site	*Cultural assemblage*
Ajmeri	OCP and microliths
Bachari	OCP and microliths
Barah-ki-Dhani	OCP and microliths
Buchahar	OCP, copper bead and microliths
Dadiya Pajyali	Harappan pottery and microliths
Jambalpur	OCP, copper slag and microliths
Khoh Mundri	OCP and microliths
Malyali	OCP and microliths
Pithal Puri	OCP
Raipur-Jagir	OCP

TAMIL NADU

72. EXPLORATION IN DISTRICT CHINGLEPUT.—K. P. Poonacha of the Southern Circle of the Survey discovered an Early Stone Age factory site in the fields to the south of the village Kalyanakuppam in the Tiruvallur taluk. The tool assemblage includes handaxes, scrapers and flakes, representing the Acheulian technique, made on quartzite.

In continuation of previous year's work of the problem-oriented survey of the Palar basin in Tamil Nadu, P. Narayana Babu of the Survey noticed urn-burial sites at Arasarkoil, Arayapakkam, Attimanam, Budur, Kilvalam, Maiyur, Padalam, Pattur, Sambadinallur, Siroppanaiyur and Tandalam which have yielded typical Megalithic Black-and-red Ware of the region.

73. EXCAVATION AT ADIYAMANKOTTAI, DISTRICT DHARMAPURI.—The Department of Ancient History and Archaeology, University of Madras, in continuation of last year's *(1980-81,*

p. 65) work carried out excavation at Adiyamankottai under the direction of K. V. Raman, assisted by C. Krishnamurti, A. Swamy, S. Gurumurti, A. Ekambaranathan, P. Ponnusamy, besides the technical staff and students.

Five trenches, AMK-1A, AMK-2, AMK-3, AMK-4 and AMK-5, were laid at different levels, and three of them revealed occupational deposit to an average thickness of 3-50 m below surface. The rich collection of antiquities and pottery would show that the site had been under active occupation right from the early centuries of the Christian era down to modern times.

The available evidence from the cuttings, viz, pottery and antiquities, are helpful in fixing up a tentative chronology for the sequence of cultures of three Periods.

Period I *(c.* 100 BC—AD 300) is characterized by the occurrence of black ware, black-and-red ware and sometimes very few bright-slipped Russet-coated Ware. A few black-and-red ware sherds bearing criss-cross, horizontal lines and dotted painted designs have been found in the earliest level of the occupation. Very few potsherds in black-and-red ware have graffiti marks resembling bow and arrow. The shapes of the black-and-red ware and black ware are confined to small vases, bowls, dishes and cups. Antiquities from this Period include shell bangles, terracotta beads and hopscotches and iron objects like nails, knife-blades etc.

A floor made of hard compact clay mixed with *murrum* was noticed in AMK-1A, belonging to this Period. It was in this level that a hearth made of clay and a number of sherds of black-and-red ware and black ware had been found. Period I is mainly represented in AMK-1A, 2 and 3.

Period II *(c.* AD 300-1000) has a rich collection of antiquities and pottery. The major ceramic types are coarse red ware and red-slipped varieties. However, some sherds of the black-and-red ware have been noticed in the lowest level of this Period, suggesting thereby the overlap with early historic cultures. Terracotta objects like human figures, lamps, spindle-whorls, ear-ornaments and beads were common, besides antiquities like soapstone points, hopscotches, iron arrowheads, nails, sickles, knives and small spears. Glass beads and bangle pieces have been collected in large quantity from this Period. The excavation of AMK-IA made it clear that the brick structure, noticed in the previous season's work, extended partly towards the west up to nearly half a metre. Though the entire plan of the structure could not be ascertained, in all probability, it might have been a raised platform or floor of a building.

Period III *(c.* 1000 onwards) is marked by the predominance of coarse red ware. Small bowls, carinated vessels and cooking pots are common. The antiquities include terracotta human figurines, terracotta lamps and beads, glass bangles and beads, iron and copper objects. A miniature *linga* with a grooved *avudaiyar,* a conical seal with an animal (?) motif, both of soapstone, and two terracotta figures representing Balakrishna are the most interesting finds of this Period. Two copper coins belonging to the British ruler George V and a brass medal with the British emblem have been reported from the top levels of this Period.

With a view to ascertaining the exact period of the construction of the mud fortification-wall at Adiyamankottai, a long trench, AMK-5, partly cutting across the rampart, was laid. The digging revealed that the rampart wall was built over the bed-rock and consisted of seven layers of superimposed earth. The seventh layer of the fortification-wall was the same as layer 3 of the first quarter in the same trench. The pottery from the fortification-wall and the adjoining area (i.e., first two quarters in AMK-5) is mainly coarse red ware of a later period. Therefore, it may be suggested that the fortification wall was erected some time during the twelfth century AD. Pebbles and stone pieces have been mixed at random and used in the construction of the fort wall. The stones acted as reinforcement for the earthen bund.

UTTAR PRADESH

74. EXCAVATION AT FATEHPUR SIKRI, DISTRICT AGRA.—In continuation of last year's *(1980-81,* pp. 66-67) work, excavations were resumed under the joint collaboration of the Survey

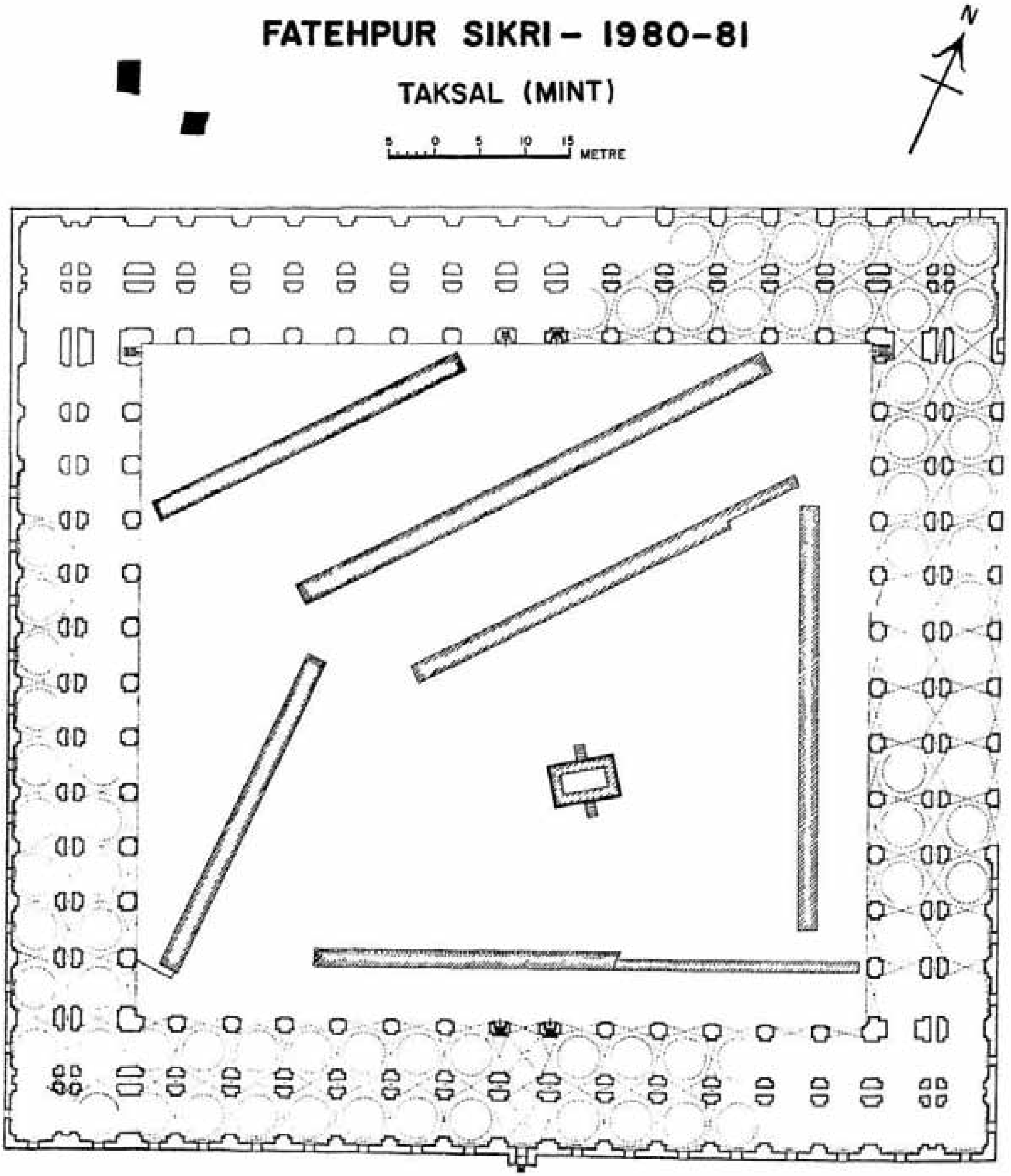


FIG. 8

and the Aligarh Muslim University. The work was directed by J. P. Srivastava and M. Khatun assisted by L. M. Wahal, C. B. Misra, S. K. Goswami, S. K. Jain, B. B. Sur, Y. K. Sharma, Chiranji Lai, Sultan Singh and N. K. Srivastava of the Survey, and R. C. Gaur, assisted by Jamal Mohammad Siddiqui, Nasir Husain Zaidi, Mohammad Anis Alvi, K. K. Mohammad, Shami Alam, Q_. S. Usmani and Mohammad Abid of the University.

Different prts of the deserted Mughal capital, viz. within and outside the so-called Mint areas in the vicinity of Delhi Gate and Diwan-i-Am, apart from the areas on both the sides of the building known as Treasury were subjected to excavations (pl. XXIII A).

The work in the central court of the so-called Taksal (Mint) was taken up by Survey's team with a view to establishing its correlation with the structural remains within the quardangle, which were commonly supposed to be the foundations of parts of coining and assaying apartments along with an acqueduct carrying water to workshop. The excavation, however, exposed a stable-yard. What were being regarded as foundation of minting complex turned out to be six dwarf walls (fig. 8), four of them traversing the quardangle diagonally and two laid straight across, parallel to the south-eastern sides of the supposed Taksal. These dwarf walls have stone rings fixed on their sides at regular intervals for securing the animals with chains or ropes.

In the south-eastern portion of the quadrangle a masonry tank (7 m long X 4.30 m wide X 1.30 m deep) on a raised platform was exposed along with a portion of the original floor of lime concrete and two flights of step on either side of the tank. The floor was not found to be fully even, as at places the original rock-surface was left untouched. The recovery of a large number of broken tiles in and around the tank suggested that it had a roof.

The finds from this area included red, blue and glazed pottery, Chinese porcelain, glazed tiles and iron objects. The shapes comprised bowls and jars.

The excavations on the sides of the so-called Mint and the Treasury unveiled house-plans and original passages.

The University team conducted excavations on the left side of Delhi Gate and laid bare structures of brick and stone, both dressed and undressed, mud floors, stone *kharanjas,* water-cistern etc. On one side was exposed a house-complex comprising living rooms, kitchen, courtyard and doorways (pl. XXIII B). The walls most probably were plastered with lime, although no trace could be detected. These remains provided fairly good idea of houses of common man during Mughal period. Slightly away, towards the west of the mosque of the Khalji period, excavations brought to light a small house-complex and the remains of a water-run from a well to the adjacent field. Attached to the mosque was found another house.

Corresponding to last season's discovery of some crossroads connected with the main road running from Agra Gate to Diwan-i-Am, an important subsidiary road was traced during this year. Originally it passed through the contours of the ridge down to Delhi Gate and was made of rubbles bound by thick lime mortar. The so-called Tansen Baradari stood on one side of it.

Trenches outside the east gate of Diwan-i-Am revealed interesting structures built at different times. Some of them were contemporaneous with the Diwan-i-Am, the rest, including the toilets and bathroom, being of later periods. It appears that there existed another entrance (gateway) for the Diwan-i-Am just in front of the existing eastern one which perhaps served the purpose of a security gate. Attached to these structures were some later buildings at road level, the exact purpose of which could not be determined.

Clearance towards the north between the so-called Taksal and the so-called royal kitchen revealed interesting structures including some massive pillars. Some of these pillars might have been part of the structures built for the supply of water. An interesting fact brought to light as a result of excavations was that the so-called Taksal was a later building constructed after Akbar's reign.

Adjacent to the so-called Treasury, towards the south, a wide area was exposed which brought to light structures of different periods. A notable discovery was a big house-complex with an attached *hammam* and elaborate drainage system. Further west another structural complex consisting of a fountain and a cistern connected with drainage-system, belonging to a late date, was exposed. Behind this area there was a road which provided access from the south to the structural complex. Some trenches were also laid near the other gate of Diwan-i-Am close to Akbar's bed-chamber. Perhaps through this gate and a stepped passage the noblemen entered the Diwan-i-Am from the south.

The present road which passes at the back of Akbar's bed-chamber towards the *Dargah* did not appear to have existed earlier. There was possibly an enclosure for the security of Emperor's bed-room.

Besides the usual red ware, the pottery included glazed and Chinese wares, black and buff sherds. Some fragments of buff ware had incised and stamped designs on them. Among the important finds were beads, terracotta objects, glass pieces, bangle pieces, glazed tiles and iron objects.

75. EXCAVATION AT SRINGAVERAPURA, DISTRICT, ALLAHABAD.—In continuation of the previous year's *(1980-81,* pp. 67-68) work, the excavation was taken up under the National Project 'Archaeology of the Ramayana Sites' by the Excavations Branch II of the Survey in collaboration with the Indian Institute of Advanced Study, Simla. The work was directed jointly by B. B. Lai of the Institute and K. N. Dikshit of the Survey, assisted by P. K. Trivedi, V. C. Sharma, D. V. Sharma, K. K. Sharma, R. S. Sharma, S. K. Sharma and L. S. Mamani of the Branch and S. K. Srivastava and K. K. Grover of the Institute. The main objectives of this seasons' work were to locate the waste-weir of the tank through which excess water must have flowed out and to ascertain more of the plan of the tank.

Accordingly, most of the trenches were laid in the south-eastern area of the tank. It was found extending up to about 200 m in length. In one of the squares, D 5, twenty-three courses of bricks of the lowest retaining wall were noticed. This wall was opposite to a group of steps having an elaborate descending arrangement. Other ends of these steps are under the baulk. These were constructed on brick-on-edge pattern and were six in numbers. The direction of these steps was towards the south and their use was possibly for coming down from the third to the second retaining wall. Further south at a distance of 20 m from these steps another group of steps was found. The full plan of these steps will be known after the removal of the deposits overlying them. From here at a distance of 14 m further south, a channel cut in the natural soil was noticed running in the east-west direction, with tapering sides. Its lower part was filled with sandy alluvium. The relationship of this channel with the main tank-complex has still to be worked out. On the top of the channel, possibly when it ceased to function, curved brick structures were raised on the southern, eastern and western sides. These structures were standing over a brick-paved platform having five courses descending in a corner towards east.

The portion opposite the brick-on-edge ramp known as *kharanja* exposed during the last year was taken up in order to know the details of the opposite arm. The second retaining wall of the tank having thirteen courses was found running. Interestingly enough, in this arm, the third retaining wall was not encountered. Instead, a bund of compact yellow earth having a small quantity of potsherds was met with. The reason for raising such a huge bund is still to be ascertained.

Out of eight structural phases that followed the desertion of the tank, three belonged to a time from late Kushana to post-Gupta periods and the remaining five to early and late medieval periods. Except in rare cases, brickbats drawn from the earlier remains were utilized in the Gupta and subsequent structures. The details of the Gupta and post-Gupta plans have yet to be ascertained. The medieval complex revealed a street running in the north-south direction

and residential complex on either side. The houses normally consisted of rooms, toilet, store room, open courtyard and covered drains. Evidence of a lime-plaster flooring was also met in one case. Besides the general plan, ovens or hearths and storage jars were also found *in situ.*

Amongst the important finds mention may be made of a terracotta female figurine with elaborate jewellery and elegant drapery and of another terracotta torso wearing a three-stringed girdle at the waist. Stylistically these belonged to the Sunga-Kushana periods. A terracotta seal reading *sabarkasya* in Brahmi characters of about the third century AD and a small stone pebble inscribed with *tir(?) raj (a) ram* in later Brahmi characters are other important discoveries (pl. XXIV A). A hoard of square and rectangular terracotta tablets having different inscribed marks was found (pl. XXIV D). One side of one of the square tablets has three parallel incised lines from one end to another, whereas the other sides is divided into four compartments and each one of them is having three incised lines. The rectangular variety generally has only one side inscribed with three parallel lines, though in one example which is bigger in size, both the sides have incised lines. Other terracotta objects included ear-studs, dabbers, arecanut-shaped beads, elephants, rattles, animal-shaped gamesman, a male torso and Yamuna on tortoise. An important discovery was a terracotta mould of a couple in low relief assignable to *circa* fifth century AD (pl. XXIV B). A number of terracotta animal and human figurines with distinct Gupta coiffure were found. A stone plaque depicting Mahisasuramardini belonged to the seventh-eighth century AD. Other important finds of the medieval period included a hoard of two hundred copper coins and eighty-seven possibly gold-plated silver coins of the Gahadavala king, Govindchandra. Other objects comprised terracotta beads, animal and human figurines, wheels and disc. Among the human terracottas is a male wearing a long hat of the European style. The head of another figure is shown half-shaven with long nose, circular ears, and three parallel lines on the forehead (pl. XXIV C). A lady wearing a skirt depicted western influence (pl. XXIV C). Other figurines wore peculiar head-dresses. A stone image of Ganesa and some parts of architectural pieces were also found.

76. EXCAVATION AT KHERADIH, DISTRICT BALLIA.-—In continuation of the last year's (i'*980-81,* pp. 69-70) work, K. K. Sinha assisted by Birendra Pratap Singh of the Banaras Hindu University resumed the excavation at KDH 3 with a view to obtaining a detailed picture of the life and pattern of settlement of different periods at Kheradih. Accordingly, the trences were laid on grid system at Mound 3 of the site. The excavation in this area revealed deposits of four successive cultural periods—I to IV. The total thickness ranges from 5 to 7 m.

The highlight of this year's work was the identification of the pre-N.B.P. deposit in the lowest levels. The excavation also brought to light the remains of a flourishing township datable to the Kushana period.

The earliest inhabitants, belonging to Period I, settled on the natural soil. The extent of settlement in this period must have been limited, as last year's excavation did not reveal any traces. No direct evidence of structural activity was found. The occurrence, however, of some pieces of burnt clods with reed-impressions indicated the existence of mud huts.

The entire pottery of these early settlers was wheel-made and fell into the following groups (i) black-and-red-ware, both plain as well as painted, recalling the corresponding ware from Ghirand; (ii) black-slipped ware, plain as well as painted, having very smooth surface and fine fabric ranging from thin to medium core, in shapes comparable to those recovered from the Painted Grey Ware level in the west on the one hand and pre-N.B.P. deposit on the other in the east; (iii) red ware, both slipped and unslipped; and (iv) plain grey ware of which there were only a few specimens. The pigment used for motif in the case of the first ware was white and executed mostly on the inner surface, the designs included a row of uniformly-thick vertical lines and semi-circles. Besides, there was also evidence of incised designs represented in the form of leaf pattern. The characteristic types in the ware were the lipped and small channelled bowl, frag-

merits of squat dish or bowl-on-stand(P) and basin. Some of the specimens in this ware have achieved a distinct smoothness and relative shine probably due to burnishing. The commoner shape in the black-slipped ware was the bowl, bearing designs in creamish white on either the exterior or interior. The motif included lattice, group of slanting or oblique lines and concentric arcs. Amongst other noteworthy types of the Period were pedestalled bases of vases in the red and black-slipped wares, jars with flared rims, basins, a perforated legged-bowl and a piece of some pot with perforation in the red ware. Bones of animals and birds were frequently met with from the strata of this period. Some of them were charred and bore cut-marks by sharp instruments.

It may, however, be mentioned that no detailed evidence regarding the other cultural equipment could be obtained due to very limited area taken for operation.

The succeeding Period II showed an appreciable change in the cultural material as suggested by objects of diverse variety, evolved ceramic industries, use of iron, glass bead-making industry, terracotta figurines and sealings etc.

The pottery of this Period was characterized by the Northern Black Polished Ware, and its associated ceramics conformed to what had been noticed previously. Throughout this Period, with its two sub-divisions as defined last year e.g., Phase I and Phase 2, the N.B.P. Ware occurred in fairly good number, ranging in colour from a golden or silvery finish to different shades of black. While Phase I represented the early level of the N.B.P. Ware, Phase 2 marked the upper limit of it. The ceramic industries of the preceding period continued; however, the Period was marked by the absence of painted black-and-red; and black-and-red ware with its notable shapes was conspicuous by their absence. The grey ware industry, which was nominal in Period I, was found in fairly good quantity. In the black-slipped ware, besides the continuation of some earlier forms, new types in the bowl evolved. The red ware too showed a change in the fabric and typology of the vessels. A variety of vases, basins with collared rims, bowl of varying profiles were met with.

This year's work brought to light some painted specimens of N.B.P., also from both the phases, akin to those reported from Sravasti. As a rule, the designs were executed with a thick creamish paint. Amongst the painted motifs mention may be made of loops, groups of vertical lines below a semi-circle and a row of small vertical lines between two horizontal bands. It may be mentioned that such painted sherds showed lustrous surface only on the exterior of the pot, while the inner surface was left plain grey.

In addition to those referred to above, certain pot-forms in red such as rimless carinated *handi,* lipped basin and pear-shapped vases, which were not recovered in earlier digging were encountered from Phase 2 of the Period. Besides, some coarse grey ware dishes and bowls bearing designs of concentric circles with raised knob at the centre of the inner base were also recovered.

Among the structural activity, at one place traces of rammed flooring, made of potsherds mixed with earth, was evidenced from the uppermost layer of Phase 1. The other important objects were a good number of circular micro-beads of copper. The finds of red glass, both finished and unfinished, along with glass canes suggested a local glass bead industry. Noteworthy was also the discovery of charred grains of pulses, most probably of lentil or kidney bear *(mung).*

The antiquities included glass bangles, hopscotch, stylus, bone arrowhead, heavy bracelet of carnelian, terracotta animal figurines and beads of semi-precious stone and bone. The noteworthy types were the pentagonal and cylindrical beads of semi-precious stone. Amongst the metallic objects, mention may be made of iron nails, copper pendent(?) in the form of a dagger and fragments of copper wire.

Immediately following the above was the deposit of Period III, which was marked by the appearance of burnt-brick structures, laid in mud mortar. Several walls which were usually built over a plinth, having a foundation either of rammed brickbats and clay or *kankar* were

exposed, but their detailed plan could not be ascertained due to their fragmentary nature. However, a draw-well constructed of wedge-shaped bricks within an enclosure of two walls was brought to light. The other finds of the Period could not be ascertained due to limited area taken for operation and also because of the later disturbances.

The deposits of Period IV were found disturbed by brick-robbers. Nevertheless, the evidence of pottery, terracotta figurines, a few sealings and coins were sufficient to date the Period. It was observed that the Period was marked by the absence of the N.B.P. Ware and its associated ceramics. The principal ceramic industry was a red ware of medium-to-coarse fabric and included the types usually occurring from the levels of early centuries of the Christian era in this region. Decoration on the pottery formed a special feature of the industry. Stamped and applique modes were frequently employed. Of special interest was a moulded boat-shaped bowl with an elaborate decoration.

The structural activity, revealed by horizontal excavation, provided fascinating data of an urban Kushana settlement for the first time in this geographical region. It was during this period that the town was planned afresh. Structurally, the Period had two sub-Periods. The structures followed the earlier tradition of brick construction. The size of the bricks fell into two groups, the smaller size measuring 38 to 40.5 cm in length, 23 to 23.5 cm in width and 6 cm in thickness and the larger averaging 41 to 42 cm X 24 to 26 cmx6 to 6.5 cm.

The most noteworthy discovery of the Period was that of a road, constructed in two phases. It was oriented east-west and was flanked on either side by a row of residential buildings. The constructional details of the road were no less interesting. It was built of brickbats mixed with *kankar* and potsherds with a compact clay soling, the top surface being rammed by brick particles and potsherds, which ensured it against wear and tear. The width of the road was not uniformly maintained throughout its exposed length of 26 m, as its width was found to be 3-66 m and 2.40 m respectively on the western and eastern end.

The plans of the houses, to some extent, were determined by the orientation of the road. Of the three houses exposed on either side of the road, only one built on the east revealed the complete plan. It comprised six total rooms, including an annexe on the northern side which might have been used as a bathroom. Its floor was built of complete bricks. An associated brick-built drain, available to a length of 8-5 m, was also discovered. The assumption of its use as a bathroom is confirmed by the gradient of the floor and the attached drain referred to above. Of the remaining five rooms, the three facing the road were square, each side measuring 2-70 m and the two, added later, were rectangular, measuring 2.70 m X 2.40 m. All the rooms of this house had pavement of complete bricks and brickbats. An unusual feature noted was that the pavement covered the plinth area of the rooms. A number of tiles recovered from the debris of this house implied that they were used for roofing the rooms.

Adjacent to the complex referred to above, there was yet another house of which only two rooms facing the road were exposed. The rooms measured 2.35 m X 1.23 m and 2.50 m X 2.35 m. Within the enclosure of one of the rooms of this house was built an underground structure belonging to the second sub-Period. The structure was square measuring 1.33 m at the highest available top and dug up to a depth of 4.26 m in twenty-nine courses, the bottom of which was not reached. The walls of the structure tapered downward and measured 98 cm at the base. It had holes on all the four faces at regular intervals right up to the exposed depth. Its use could not be ascertained. It may have served as a kind of storage.

The small finds of the Period comprised: pottery discs with single or double perforations or without, terracotta balls of varying sizes, skin rubber, dabber, potter's stamp, wheel, cone, stopper, rattles, pestle, wheeled toys representing bull and elephant, with a hole through nostrils; bone points; beads variously made of terracotta, glass and semi-precious stones; copper antimony rod, bangle, bracelet and ear-ornament; stone pestle, pounder-cum-pestle and legged-quern; iron nail, knife-blades, shovel, rod, lamp, ring and sickle; terracotta human and animal

figurines being typical of the Kushana and Gupta styles, including a mould showing a smiling boy; a terracotta seal marked with a taurine symbol within a crescent; and a terracotta sealing bearing the legend *ka(kshi)la* in Brahmi characters of the third-fourth century AD. A number of Kushana coins, circular in shape, were also found. Mention may also be made of a terracotta mould (?), meant probably for making beads.

On the basis of the present finds, the beginning of the occupation at Kheradih would probably be dated back to the ninth-eighth century BG, while the later phase revealed by the present excavation might have lasted up to fourth century AD.

77. EXPLORATION IN DISTRICT BIJNOR.—In the course of exploration, Vinod Kumar of the Northern Circle of the Survey discovered the following sites:

Tahsil	*Village/site*	*Cultural assemblage*
Bijnor	Adampur	Late medieval temple
-do-	Bagichi	Architectural fragments of the medieval period
-do-	Mubarak Ferozpur	Medieval pottery
-do-	Gajraula	Aziz-memorials of the medieval period
-do-	Gajraula Shiv	Medieval temple
-do-	Mandauli Saddu	Medieval mosque
-do-	Suaheri-khurd	Late medieval temple
-do-	Umarpatti	Northern Black Polished Ware and grey ware
Nizibabad	Bijepur	Medieval pottery
-do-	Bijar Khatta	Late medieval temple
-do-	Birpur	Medieval pottery
-do-	Ganguwala	Early historic pottery
-do-	Ghosipura	•Sati'-memorial of the late medieval period
-do-	Girdawa Sahnpur	Late medieval temple
-do-	Gulalwali	Medieval pottery
-do-	Gulam Alipur	Medieval mosque
-do-	Jafarabad	Kushana pottery
-do-	Jaswantpur	Painted Grey Ware and fine grey ware
-do-	Khera	Medieval pottery
-do-	Kishanpur	Medieval pottery
-do-	Mathurapur-Mor	Kushana pottery
-do-	Nakipur-Bamnauli	Painted Grey Ware, grey ware and Kushana pottery
-do-	Nekpur	Medieval pottery
-do-	Parbatpur-Makhdumpur	Late medieval Siva temple
-do-	Rahmanpur	Medieval pottery
-do-	Sikandarpur- Basi	Medieval pottery

78. EXPLORATION IN DISTRICT ETAWAH.-—In the course of exploration, G. A Qamar of the Northern Circle of the Survey discovered the following sites:

Tahsil	*Village I site*	*Cultural assemblage*
Auraiya	Allahpur	Medixeval pottery
-do-	Anguthia	Fine grey ware, Northern Black Polished Ware and its associated pottery

Tahsil	*Village/site*	*Cultural /assemblage*
Auraiya	Bakharia	Tomb and a mosque of Mughal period
-do-	Burhadana	Late medieval temple
-do-	Chirahaulia	Medieval pottery
-do-	Jua	Medieval pottery
-do-	Kakor-khurd	Medieval pottery
-do-	Khanpur	Medieval temple
-do-	Kheola	Medieval temple
-do-	Mathaipur	Medieval temple
-do-	Modena-Ramdatta	Medieval pottery
-do-	Milk Husainpur Kalan	Northern Black Polished Ware and its associated pottery, besides medieval pottery
-do-	Passaipur-Kashampur	Medieval mosque and pottery
-do-	Rampur Behari	Medieval pottery
-do-	Ratuwa	Medieval pottery
-do-	Salaiya	Medieval pottery

79. EXPLORATION IN DISTRICTS FATEHPUR, JAUNPUR AND PRATAPGARH.—A team of the University of Allahabad under the direction of G. R. Sharma explored the region in the Ganga Valley falling in the above-mentioned districts. Sherds of N. B. P. Ware, black-slipped ware, black-and-red ware and the associated red ware were collected from Bindaur, Chakki, Kabra and Kora in District Fatehpur. While N.B.P. Ware along with other associated pottery was found at Bajalha, Chandi and Ramdiha, early medieval remains were located at Itaha and Laharapur in District Jaunpur. N.B.P. Ware was picked up from a mound at Gandhiawan in District Pratapgarh.

80. EXPLORATION IN DISTRICT GHAZIPUR.—The Post-Graduate students of Archaeology and Museum of the Sampurnanand Sanskrit University, Varanasi, under R. B. Narain, re-explored the ancient site at Vairat. The site had earlier yielded punch-marked coins and other associated material belonging to the early historical period. During the present exploration three terracotta figurines datable to the first-second century AD (pl. XXVI A and E) along with a few sherds of black-slipped ware and red ware of the Kushana period have been recovered.

81. EXCAVATION AT HULASKHERA, DISTRICT LUCKNOW.—In continuation of the last year's *(1980-81,* p. 71) work, the Department of Archaeology, Government of Uttar Pradesh, under the direction of R. C. Singh assisted by Hem Raj and Rakesh Kumar Srivastava, resumed the excavation with a view to exposing the citadel belonging to the Gupta period and the road of the Kushana period built across the lake.

The road across the surrounding lake running in north-south direction was unearthed in two phases. The first phase was about 9·80 m in width, built with burnt bricks measuring 39 X 23 X 6 cm, 37 X 22 X 6 cm and 35 X 22 X 5 cm. It was built in double-box pattern with parallel walls on either side and also a wall in the centre. The side walls measure 65 cm and central wall 40 cm in width. The boxes have been constructed at the intervals of 2.30 to 3.00 m. All the boxes were found filled with compact blackish clay taken from the lake itself. The surface of the road was made of brick-ballast mixed with earth. The double rectangular boxes intended

apparently to hold the dumped clay in position and prevent it from being washed away by water. It has been exposed in a stretch of about 120 in length which is continuing on both sides.

The second phase of the road belonging to the Gupta period is 5 m in width overlying the earlier road. The outer faces were built with brick-bats in footing pattern, while the inside was filled with brickbats and earth.

The citadel of the Gupta period was also partially exposed during this year. Three walls of the citadel fort with its main entrance in the west were completely exposed. The walls are 2.50 to 2.75 m in width and built with brickbats only. Two outlets in the western wall were discovered. The northern, western and southern walls are 160, 157 and 148 m long respectively. A number of staircases have been provided in the fortification walls from inside.

The contemporary pottery in the fort consisted of wheel-turned red ware ranging from medium to coarse fabric. The main types included storage jars, short and high-necked water-vases, bowls, dishes, lipped bowls, *surahis,* spouted vases and lids with various type of knobs. Spouted sprinklers, high-necked vases, lids of ink-pot type and lipped bowls of earlier period have also been recorded.

The important finds include terracotta human figurines showing various hair-styles, Naigamesha, and copper and silver coins of the Kushana and Gupta rulers. Seals and sealings bearing legends in characters of the Gupta period are also noteworthy. Stone sculptures of Ganesa and a few other deities have also been found.

82. EXCAVATION AT HULAS, DISTRICT SAHARANPUR.—In continuation of last year's *(1980-81,* pp. 73-76) work the excavation was resumed at Hulas by the Excavations Branch II of the Survey under the direction of K. N. Dikshit, assisted by P. K. Trivedi, V. C. Sharma, D. V. Sharma, R. S. Sharma, L. S. Mamani, S. K. Sharma, B. B. Sharma and Vidya Ram Sharma. The main objectives of this year's excavation were (i) to ascertain the further extension of the solid Harappan mud-platform and its relationship with the habitational area and (ii) the nature and extent of the burnt-brick structure consisting of wedge-shaped bricks and its relationship with the massive burnt-brick structure belonging to Period IV.

Period I revealed, in the habitational area, walls and successive floor levels of rammed earth with burnt patches. The solid mud platform made of compact earth was found running from west to east and merging imperceptibly with the low-lying area. The platform running towards the habitational area was cut by a rain-gully. The Harappans occupied the southern part of the mound and thereafter raised a platform as a protection against the flood. That it was raised by the Harappans themselves was proved by a few pits containing Harappan pots on the top of the platform. Near these pits, a few small furnaces which were possibly used for baking small objects were also noticed. The remains of a structure (1.38 m long) with three offsets were also encountered on the top of the platform. The structure was constructed of wedge-shaped burnt bricks with mud mortar as binding medium. The occasional marks of husk used as degraissant were visible. These bricks had three deep diagonal frog-marks from one end to another. This structure perhaps served as a revetment.

A mud-brick wall (2.04 X 0.31 X 0.15 m) along with a mud-brick floor forming a part of a residential complex was also noticed. The size of the mud-bricks was 47 X 30 X15 cm. Another mud-wall measuring 3.66 X 0.35 X 0.11 m was also encountered at this level. A massive stone quern was also found. In addition to a few non-Harappan painted designs having pre-Harappan tradition, two potsherds with *pipal* leaf design were also encountered (fig. 9). A potsherd with incised cord design on the exterior and deep compartmented design on the interior was also noticed. A singular pot with a hole in the centre, looking like a *moda,* having bands of incised wavy lines within horizontal registers was of special interest. Amongst the antiquities mention may be made of terracotta balls, beads, wheels, circular cakes and beads and bangles of faience.

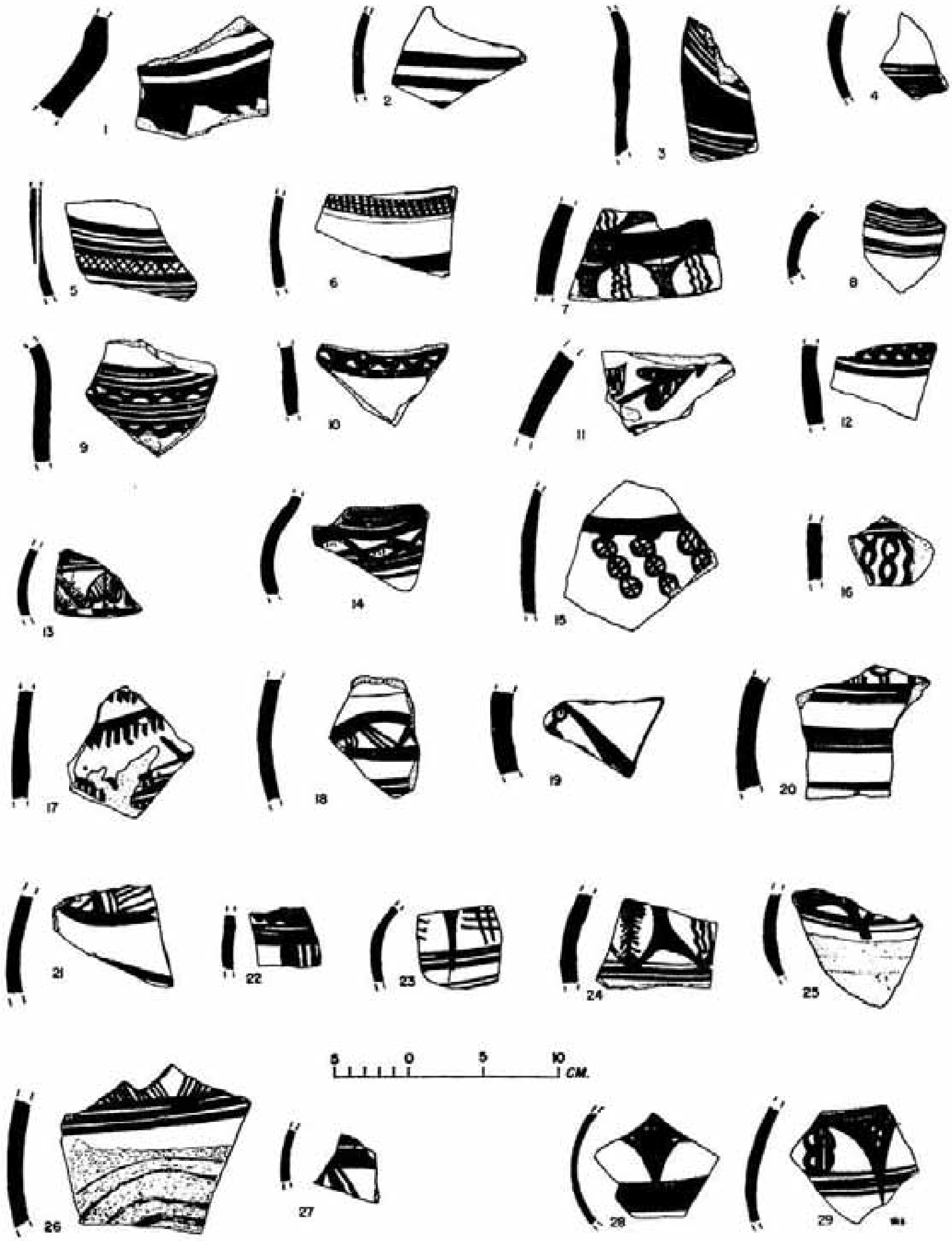


FIG. 9. *Hulas : Harappan painted potsherds, Period I.*

In Period II, pits dug by the Painted Grey Ware people were noticed on the southern side of the mound once occupied by the Harappans. The motive of these pits is difficult to explain. Antiquities from these pits included terracotta *ghata-shaped* beads, bone points, antimony rods and a spearhead of iron. An important find was a long bone pin having circular drum-like end decorated with an incised design (pl. XXV B).

Period III associated with the Northern Black Polished Ware revealed a platform of rammed clay mixed with potsherds, an oven and a few post-holes. The types of the red ware of this period included Ahichchhatra 10 A, carinated *handi* etc.

In Period IV a few burnt-brick walls were found near the top of the mound. The relationship of these walls with the main massive burnt-brick structure (no. 1) has yet to be worked out (pl. XXV A). A covered drain with projection was also noticed in the east-west arm of the massive structure. On further investigation of the already-exposed burnt-brick structure no. 2 consisting of wedge-shaped bricks, as many as eleven courses of bricks were noticed. A rectangular pillar of burnt-bricks was encountered on the eastern side in the middle of the last year's excavated entrance. A semi-circular niche (diameter 0.90 m) was seen in the middle of the western wall of structure no. 2. Antiquities included: terracotta beads, bangles, balls, dabbers with chess-board design and animal figurines; iron objects; a copper bowl and coins; and terracotta sealings in Brahmi characters assignable to the Kushana period (pl. XXVI D).

Period V revealed jars and vases in red ware with bright-red slip and mica treatment. A few stamped pots were also noticed. Other objects included terracotta beads, iron objects and copper coins belonging to the medieval period. The outstanding find was an ivory scale having twelve divisions marked by circles (pl. XXV B).

WEST BENGAL

83. EXPLORATION IN DISTRICT BANKURA.—Dilip K. Chakrabarti and R. K. Chattopadhyay of the Department of History, University of Delhi, during the course of exploration discovered Lower Palaeolithic tools including bifaces and side-scrapers in quartz at the Guniada hill in the Silavati valley. A biface was also picked up at Majuria near Damodarpur in the Dwarakeswar valley. Microlithic tools were discovered at the following sites in different river valleys of the district: Barjora, Ituri, Daiso, Kushthalia and Beldanga in the Damodar valley; Amar Kanan, Beliatore and Kara Pahar in the Sali valley; Pacha Simulia, Parulia, Paharbeda, Suyabasa, Jamthol and Gidhuria in the Gandheswari valley; Damodarpur, Majuria and Dhaldanga in the Dwarakeswar valley; Bhagabandh, Krishnagar and Bhaturi in the Ujani valley; Deulbira temple, Deulbira bridge and Badlar Ghat in the Arkasa valley; Patirdanga, Deulgara, Satir Ghat, Makrasinitala, Kadamdeuli, Junbediya, Harinbira, Bandeuli, Giorda, Gobindapur, Benjtabani, Silavati Dam, Namokachenda, Anardihi, Bibarda, Amghata and Guniada hill m the Silavati valley; Mukundapur, Gorabari Kansvati colony, Hatikheda and Navachiada in the Kumari-Kansavati valley; and Darpal in the Tarafeni valley.

Microliths, bone tools and black-and-red ware were discovered at Kumardanga in the Tarafeni valley. Microliths were collected from Tulsipur in the Kansavati valley. Microliths were found in association with two small neolithic celts and few pieces of iron implements in the cliff section at Shulgi on the left bank of the Silavati.

In addition medieval sculptures were discovered at Brahmandiha, Jorda, Balarampur, Junbediya. Makrasinitala. Panchpukhura and Jorda. Among the interesting discoveries is a four-faced *Sivalinga* at Jorda.

84. EXPLORATION IN DISTRICT MIDNAPUR.-S. De, D. K. Roy and B. Samanta of the Department of Archaeolgy, Government of West Bengal, explored the area around Lalja cave in the Kansavati valley. Developed Acheulian handaxes were collected from the secondary

laterite deposit lying in the vicinity of villages Belpahari and Ghagri. A scraper bearing signs of retouching, a punch-like tool, waste flakes and a broken ring-stone were picked up from Domgar, 3 km to the south-west of Belpahari. One arrowhead of Late Stone Age and two points of Middle Stone Age were collected from a site near the confluence of the Tarafeni in the neighbourhood of Devapahar. Beldiha near Kuthi Ghat and Devapahar at Laljal, about 6 km from the Tarafeni was also explored with a view to ascertaining if the cave at Laljal had ever been used by the Stone Age man. No conclusive evidence of occupation of the cave by early man came to light. However, a few flakes and waste flakes of the Late Stone Age, a few potsherds, a piece of conch-shell bangle and a few partly fossilized pieces were collected from the cave.

85. EXCAVATION AT RAJBADIDANGA, DISTRICT MURSHIDABAD.—The Department of Archaeology, University of Calcutta, resumed excavation at Rajbadidanga. Only two trenches E'—3 and E'—4 were excavated with a view to finding out the north-eastern side of the gateway wall which was partially exposed during last year 'n trench D'—3. In both the trenches the digging was continued down to a depth of 3.05 m below the surface, revealing the foundation wall of the platform of Period I at a depth of 2.74 m. The natural soil composed of Gangetic silt was found in both the trenches at an average depth of 3.05 m below the surface.

Excavation revealed structures of Period II in E'—3 at a depth of 45.72 cm below the surface. A wall having thirteen courses of brick was found continuing across the southern section. This wall was exposed last year in D'—3 running in south-north direction. Near the middle of the southern section of E'—3 and at a distance of 45.72 cm from the cutting edge, this wall formed a corner and turned westwards and ran in east-west direction up to a length of 3-35 m. In E'—4 this wall was found missing; instead, the existence of huge debris of brickbats and bricks suggest ample evidence of brick robbing. The most interesting structure uncovered (pl. XXVII) in this trench (E'—4) was the remains of another wall running in east-west direction having as many as twenty-nine courses of bricks continuing at a stretch. This wall continued in east-west direction towards the main wall of the monastery, which was found running north-south in trench E'—4.

Deep digging in the areas of western section of E'-3 and southern section of E'-4 revealed the foundation of the earlier platform composed of large-sized well-burnt complete bricks. Remains of *surkhi* rammed floors corresponding to walls were uncovered.

The excavation yielded fragments of jars, pans, dishes, plates, sprinklers, knobs and lamps from all levels. Miscellaneous finds included beads, fragments of bangles, copper rings, cowries, iron objects, seals (pl. XXVI B and C) and sealings from Phase II level. Phase I revealed pieces of finely-polished red and black wares.

86. EXPLORATION IN DISTRICT PURULIA.—Dilip K. Chakrabarti and R. K. Chattopadhyay of the Department of History, University of Delhi, during the course of exploration discovered Lower Palaeolithic tools, all bifaces, in the Kana Pahar area near Balarampur. A few Middle Palaeolithic scrapers were also found in the same area. Near Balarampur Dak Bungalow one could locate Middle Palaeolithic point-cum-double-sided scrapers and Upper Palaeolithic blade cores and blades in a distinctive flint-like blackish stone, occasionally with white patina. The material in the vicinity of the Balarampur Dak Bungalow is a material brought from somewhere in the neighbourhood. It was not possible to locate the original source. An Upper Palaeolithic industry comprising burins, gravettian points, side-scrapers, end-scrapers, retouched blades, retouched backed knives, borers, retouched flakes and cores were located in the reserve forest near Dabha village on the Balarampur-Baghmundi road.

The microlithic tools were collected from Bersa, Budhaar, Kana Pahar and Sirgi in the Kana Pahar area near Balarampur, Dabha on the Balarampur-Baghmundi road, Ayodhya, Bidyajara, Hatinada and Jilintar in the area near modern Ayodhya village, Chandan Muni Pahar and Bara Pahar near Sirkabad, Karali Pathar and Doblar Jor near Bandowan, Kuilapal, Yatra Dungri, Dhalburu, Sikhar Pahar and Bancha Pahar near Jhalda, Jai Chandi Pahar near Raghunathpur, Deulbira near Para, Anai Jambad, Ralibera and Budhpur in the Kansavati valley. Besides these, neolithic tools were also noticed in association with microliths at Bersa (two fragmentary polished stone celts), at Dabha (three chipped and flaked celts, one rectangular adze and a muller) and at Jilintar (five chipped and flaked small celts).

Medieval sculptures were discovered at Anai Jambad, Ralibera and Sitalpur, having a lintel carved with different iconic figures.

II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS[1]

ANDHRA PRADESH

1. BANA INSCRIPTIONS, AGRAHARAM, DISTRICT CUDDAPAH.—These two identical 'abel inscriptions, engraved in Telugu language and characters of the ninth-tenth century AD, refer to a fight between an elephant and a donkey.

2. BANA INSCRIPTION, ANKALAMMAGUDURU, DISTRICT CUDDAPAH.—This undated inscrip tion, engraved in Telugu language and characters of the ninth-tenth century AD, records a gift of land by Dhevaleyaraju to a certain Duggara.

3. CHALUKYA INSCRIPTION, ANKALAMMAGUDURU, DISTRICT CUDDAPAH.—This inscription in Telugu language and characters, engraved on three sides of a slab and assignable to the seventh century AD on the basis of its palaeography, records the gift of a village to Chebasarmma by a certain Tandiramulu, the ruler of Kuchhenri, while the king Ereyappor was ruling the country Perbbanapadi. This Ereyappor may be identified with Pulakesi II who was also known as Ereyamma and Ereyati-adigal.

4. VIJAYANAGARA INSCRIPTION, KOPPOLU, DISTRICT CUDDAPAH.—This inscription, engraved in Telugu language and characters and dated in Saka 1466 (AD 1544), belongs to the Vijayanagara king Sadasivadevamaharaya. The epigraph records the remission of taxes in the village Koppolu *alias* Krishnarayapuramu by a certain Pedda Mallaparaju on the orders of Nandela Timmayaraju.

5. TELUGU-CHOLA INSCRIPTION, TALLAPAKA, DISTRICT CUDDAPAH.—This inscription, engraved in Telugu language and characters, belongs to the time of Mudigonda Chola Maharaja and is dated in Saka 1158 (AD 1236). It records the royal gift of land for the worship of the god Umesvarabhatara at Pedapaka.

6. KALYANA CHALUKYA INSCRIPTION, NAGANUR, DISTRICT KARIMNAGAR.—This inscrip tion belongs to the reign of Ahavamalla (Taila II) and is in Kannada language and characters. It is dated in Saka 914, Nandana (AD 997). It records the construction of the Narayana temple and also registers some gifts of land. A certain Sivadeva and *Mahajanas* are also referred to in the inscription.

---

information, from: 1 to 9, 11-16, 18-30, 36-43, K. V. Ramesh, Chief Epigraphist, who assisted by Madhav N. Katti, Ram Sharma, M. Jayarama Sharma, S. Subramonia Iyer, N. Nanjundaswamy, C. A. Padmanabha Sastry, P. Venkatesan and D. M. Nagaraju found, copied, examined and reported nearly two hundred inscriptions during the year, (the important ones being noticed here), 10; North-western Circle of the Survey; 17, Director, Archaeology and Museums, Government of Karnataka; 31, Ancient Indian History, Culture and Archaeology, University of Nagpur; 32-35, Western Circle of the Survey; and 44, Maheswar P. Joshi, Kumaun University, Almora; and 45, G. C. Pande of University of Allahabad.

7. TELUGU INSCRIPTION, KONDAPALLI, DISTRICT KRISHNA.—This inscription is in characters of the seventeenth century AD and records a gift of land to the god Narasimhasvami by Annaraju, son of Komaraju-Palaraju, after the installation of the image.

8. CHAGE INSCRIPTION, PENUGANCHIPROLU, DISTRICT KRISHNA.—This record, in Sanskrit and Telugu languages, is engraved in Telugu characters of the twelfth-thirteenth century AD. It belongs to the reign of the Nadavadi chief Damodara and records the gift of land to the deity Umesvara by Darapuraju, son of Bhimaraju, a subordinate of Damodara.

9. TELUGU INSCRIPTION, UNDIGRAMAM, DISTRICT WEST GODAVARI.—This inscription is in Telugu language and characters of the thirteenth century AD and registers a gift of land to the god Suresvara for daily offerings, perpetual lamps etc. by the *Pradhani* of a chieftain (name not clear) who bears the epithet *Kamalakarapuravallabha.*

HIMACHAL PRADESH

10. NAGARI INSCRIPTION, BALAG, DISTRICT SIMLA.—S. N. Kesarwani and R. N. Kaw of the North-western Circle of the Survey discovered an inscription in Nagari characters of the twelfth-thirteenth century AD. This four-lined inscription is engraved on the pedestal of a standing image of Mahishamardini placed in the sanctum of the ancient Siva temple.

KARNATAKA

11. CHOLA INSCRIPTION, ALUR, DISTRICT BANGALORE.—The inscription in Tamil language and characters belongs to the reign of the king Rajendra Chola I and is dated in his thirty-second regnal year (AD 1044). The record begins with the short *prasasti Purvadesamum* etc., of the king and mentions *Kadarangonda Sola-Brahmarayarnivandam* (endowment). It refers to Pallavaraiyar Nolamba Kamundan of Alur in Pandiya-nadu, and records the construction of the lake *(eri),* the *todukarai* (embankment ?), sluice *(tumba)* and the temple *(deva-koyil)* and a gift of two *kani* and one *ma* of land to the temple by him. The endowment seems to have been received by Nulambakamundan.

12. VIJAYANAGARA INSCRIPTION, MANUR, DISTRICT BELLARY.—This Kannada inscription is engraved on a stone towards the eastern side of the temple of Anjaneyasvami. It belongs to the reign of Viravenkatapatideva and is dated in Saka 1519, Hemalambi (AD 1597). The inscription registers the gift of the village Manuvuru for the worship and offerings to various gods such as Virabhadra, Chennamallikarjuna and Kedaradeva etc., by Devarasi, the queen of Viranna odeya, Hanuminayaka and others. It also records some other grants of land.

13. THREE KALYANA CHALUKYA INSCRIPTIONS, GORTA (B), DISTRICT BIDAR.—All the three Kannada inscriptions belong to the reign of Tribhuvanamalla (Vikramaditya VI) and are dated in Chalukya Vikrama year 7, 37 and 53 (AD 1082, 1112 and 1128). The first one refers to the famous teacher Rudrabhatta, who has been highly extolled. It also records a grant of (six) villages as *devabhoga* to the god Rudresvara for various offerings such as *angabhoga,* music concert, dance performances, choultry, repairs of the temple etc. The name of the donor is lost in the damaged middle portion of the record.

The second inscription records the gift of one cart-load of maize to the god Kumbhesvara for daily offerings, oil-lamps etc., jointly by *Bhattavemteya-dannayaka* Savasi Pommanayya and *Senaboya* Gangarasa.

The third one refers to the *asesha-mahajanas* of the *Sarvvanamasyad-agrahara* of Goranti [Gorta (B)], the find-spot of the epigraph, and also to a learned *Brahmana* scholar (whose name is not clear). It seems to record some gift of lands for offerings to the gods Nagesvara, Maltesvara and others. Lastly it states that Mayipayyanayaka and another person (name not clear) granted a garden to the same gods.

14. KALYANA CHALUKYA INSCRIPTION, MUCHALAMBA, DISTRICT BIDAR.—This Kannada inscription on a stone, set up in front of the Ramalingesvara temple, belongs to the reign of Tribhuvanamalla (Vikramaditya VI) and is dated in Chalukya Vikrama year 50, Visvavasu (AD 1125). The inscription records the gift of 12 *mattas* of land, garden and a house-site in Kaduhalli-Muchchalamba near Narayanapura to the deity Sriramesvara, donated by the *Manneyas* of the place. It also records a few more gifts for the daily offerings, perpetual lamp and repairs to the temple by various persons.

15. WESTERN CHALUKYA INSCRIPTIONS, NARAYANAPURA, DISTRICT BIDAR.—Of the three Kannada inscriptions, the first one mentions the date as Chalukya Vikrama year 37, Nandana, Pushya su. 4, Monday which regularly corresponds to AD 1112, December 23. The second one in characters of the twelfth century, refers to the gift of land to God (Siva) by two *settis* and mentions the village Goranti. The third one belongs to the reign of Bhulokamalla (Somesvara III) and is dated in the king's regnal year 3, Saumya (AD 1129). It records the gift of land 30 *mattas* black soil to the god of Mulasthana (I)svara in the village Narayanapura by *mahamandalesvara* Permmadiarasa on the occasion of *Makara-samkranti.* It also records a few more grants like offerings, house-site etc., to the god.

16. SATAVAHANA INSCRIPTION, VASANA, DISTRICT DHARWAR.—This inscription, in Brahmi characters and Prakrit language of the third century AD, is engraved on a limestone pillar found lying over a small mound on the bank of the Malaprabha river. It records the making of (Ka)tteti i.e., the sculptured pillar bearing the inscription by a carpenter *(vadhaki)* for the (temple of) the god Chamdasiva Mahadeva, the inhabitant of *moreyatana* during the time of the (Satavahana) king Vasithiputa Siri Pulumavi.

17. COPPER-PLATE INSCRIPTION, TINTHINI, DISTRICT GULBARGA.—A set of three copper plates, dated AD 1016 and issued during the reign of the king Jayasimha II of the Ghalukyas of Kalyana, records the grant of land for the boarding facilities to the students studying in Traipurushasala at Agrahara Tinthini Sirivura.

18. HOYSALA INSCRIPTIONS, HALEBIDU, DISTRICT HASSAN.—Of the two Kannada inscriptions, one belongs to the reign of Somesvara and is dated in Saka 1063 (wrong for 1062), Raudra (AD 1140). It records the construction of a temple by his feudatory Benteya-Tippanayaka along with his wives, children and friends. It also registers a gift of land near the Hulluni-tirtha of Varada Sangama situated at Banavase-nadu after laving the feet of Nagarasi-pandita, for the maintenance of the temple, repairs, offerings of food to the temple-priest and the perpetual lamps. Further, it mentions some more gifts to the same god. The second one is dated as Khara, Jyeshtha su. 1, Sunday which regularly corresponds to AD 1231, May 4. It records some gifts to the god Brahmesvaradeva for various offerings.

19. Two JAINA INSCRIPTIONS, SRAVANABELAGOLA, DISTRICT HASSAN.—Both are in Kannada language and characters of the eleventh century AD. Of the two, the first one records that Nayakirtti, disciple of Munayakirtti, granted some wet lands to the services of Akkanabasadi. The second one, which is engraved below, states that Chandraprabhadeva,

disciple of Nayakirtti who was the disciple of Munayakirtti Siddhantachakravartti granted some lands as *devabhoga* for *devasiganatana* in Akkanabasadi near the tank of Somasamudra at Chomeyanahalli.

20. KALAGHURYA INSCRIPTION, CHALAGERI, DISTRICT RAICHUR.—This inscription engraved on a stone slab in Kannada language and characters, kept in front of the Lakshmidevi temple, belongs to the reign of Rayamurari Sovideva. Dated in the Saka year 1093, Vikrita (AD 1171), it records a gift of land, alter obtaining the permission of the Hoysala king, possibly Viraballala II, to the god Lakshminarayana for daily worship and offerings by Lakshmideva-dandanayaka. Further, it registers a grant of land for offerings of food etc., to the god Mahadeva by the *Mahajanas* and Bhattopadhyaya of Chaigeri.

21. TWO KALYANA CHALUKYA INSCRIPTIONS, GOVANTAGI, DISTRICT RAICHUR.—Of the two Kannada inscriptions, the first one belongs to the reign of Jagadekamalla (Jayasimha II). Dated in the Saka year 946, Raktaksha (AD 1024), it records a grant of land near the village Govanti, situated in the division of Kalma-400, for the worship of the deity Svayambhu Kalideva. It further records another grant to the god Mavanadeva for offerings of food. The second epigraph is dated in Saka 967, Parthiva (AD 1045) and belongs to the reign of Trailokyamalla (Somesvara I). It mentions a gift of land to Chamundabhattopadhyaya of Govanti.

22. KALYANA GHALUKYA INSCRIPTION, HESARUR, DISTRICT RAICHUR.—This Kannada inscription belongs to the reign of Tribhuvanamalla (Vikramaditya VI) of the Chaiukya dynasty and is dated in the Chalukya Vikrama year 29, Tarana (AD 1104). It records a gift of land made for worship and offerings to the god Adityadeva. The grant was entrusted to Boppana, son of Baviraja.

23. KALYANA GHALUKYA INSCRIPTIONS, HIREMANNAPURA, DISTRICT RAICHUR.—Of the two Kannada inscriptions, the first one gives the genealogy of the Kalyana Chalukyas down to Vikramaditya V. Dated Saka 919, Hemalambi (AD 9y7), it records a grant of land by the *Mahajanas* of Narayamgai probably to a god (name not clear).

The second inscription in characters of the eleventh century AD belongs to the reign of Ahavamalladeva (Somesvara I), which mentions his feudatory Ku(mara)varmadeva, who is stated to have been ruling over Karadikallu. It records a gift of land to the *Urodeya* of Narayamgallu, probably by the chief. The details of the grant portion are damaged.

24. KANNADA INSCRIPTION, MANAKALAKERE, DISTRICT RAICHUR.—This Kannada inscrip tion, engraved on a stone lying in the field of Basavayyasvami, belongs to the reign of Tribhu vanamalla (Vikramaditya VI), dated in the Ghalukya Vikrama year 4y, Subhakrit (AD 1124). It records a gift of and for worship and offerings to the god Mailesvara by the Maehagavunda of Ucchangi. The gilt was entrusted to Samkarasi-pandita. It further records another grant to the god Namagamundadeva for daily food offerings.

25. TWO CHALUKYA INSCRIPTIONS, MUKKUNDA, DISTRICT RAICHUR.—Of the two Kannada inscriptions, the one belonging to the reign of Tribhuvanamalla (Vikramaditya VI) is dated in the Ghaiukya Vikrama year 21, Dharti (AD 1097), and records the gift of land to the god Somalingesvara for daily offerings, repairs, clothes, choultry etc., by his feudatory *Mahamandalesvara* Bacharasa, a new officer not stated so far. The other record belongs to the reign of Bhulokamalla (Somesvara III), dated in Bhulokamalla year 9, Ananda (AD 1134), gives the genealogy of *mahamandalesvara* Ba(sava)rasa. This inscription records a gift of land to the god

Kesava by *Perggade* Chemna Bhimayya who is also credited with the installation of the image of the same god. It further records a number of grant for various offerings and the house-site for the *archaka* and others.

26. CHALUKYA INSCRIPTION, PURA, DISTRICT RAICHUR.—This inscription, in Kannada language and characters, dated Saka 940 Siddharthi (wrong for Kalavukta) (AD 1018) belongs to the reign of Jagadekamalla (Jayasimha II). It records the gift of land to Kondaya Varilayyanaya in front of the god Virupaksha by the king's feudatory (name effaced), who has been extolled as *mahasamantadhipati, mahaprachandadandanayaka, vairi-bhayadayaka.* It further records some grants to twelve *brahmanas* and to the gods Mulasthanadeva and Brahmadeva etc.

27. VIJAYANAGARA INSCRIPTION, PURA, DISTRICT RAICHUR.—This inscription belongs to the reign of Sadasiva. It is in Kannada language and characters and dated Saka 1-469, Plavanga (AD 1547) and records certain gifts of taxes from the village Pura to the god Somesvara by Krishnappanayaka, who obtained the village Pura as *maganige,* in order to accrue merit to both the king and himself.

28. KALYANA CHALUKYA INSCRIPTION, SIRAGUPPA, DISTRICT RAICHUR.—This inscription is in Kannada language and characters of the twelfth century AD. It records the rescue of the cattle of the village Siraguppa by Achama-gavunda and Chava-gamunda, the *talaras.* Further, it also mentions a gift of land made in memory of the deceased by Bacha-gavunda.

MADHYA PRADESH

29. PARAMARA COPPER-PLATE INSCRIPTION, INDORE, DISTRICT INDORE.—This inscription written in Sanskrit language and Nagari characters on a set of two copper-plates, originally found in the village Pippalada and now preserved in the State Archaeological Museum at Indore, belongs to the reign of the Paramara king Bhoja. Dated in Vikrama 1078 (AD 1021). This charter records the grant of the village Dhanyapuraka situated in Kampilya-bhoga to the *brahmana* Ramabhattadikshita on the occasion of two *tulapurushadanas* for the merit of his parents and his own self. The grant was made in the month Chaitra of the previous year (AD 1020) and was engraved on the second date (AD 1021) mentioned above.

30. PARAMARA STONE INSCRIPTION, UJJAIN, DISTRICT UJJAIN.—This inscription written in Sanskrit language and Nagari characters of the tenth century AD was originally found at Rangabavadi near the Mahakala temple at Ujjain. Now kept in the Vikram Kirtti Mandir at Ujjain, this fragmentary inscription is a *prasasti* of the Paramara king Bhoja. The epitaph speaks of Bhoja's encounters with the contemporary Pratihara rulers. The *prasasti* was composed by the poet Venu.

MAHARASHTRA

31. COPPER-PLATE INSCRIPTION, MANDHAL, DISTRICT NAGPUR.—This inscription of the Vakataka king Rudrasena II is engraved on a set of four plates, now deposited in the Archaeological Museum of the Department of Ancient Indian History, Culture and Archaeology, University of Nagpur. It records the grant of four villages situated on the *purva-marga* of Padmapura for the maintenance of a couple of temples at Vatsagulma (Washim, District Akola) by Rudrasena II in the fifth year of his reign. This record, executed under the supervision of the *Senapati* Vibhishana, is the first record of Rudrasena II discovered so far and proves that he ruled for at least five years.

RAJASTHAN

32. PRATIHARA COPPER-PLATE, BODHAL, DISTRICT JAIPUR.—Two Pratihara copper-plates of the eighth-ninth century AD were found at Bodhal.

33. MEMORIAL-STONE INSCRIPTION, DISTRICT PALI.—One of the inscriptions, found in the village Bijapur, records the death of Munja Balia Chauhan and is dated Samvat 1171. Another inscription, dated Samvat 1194 records the death of a Rajput of Bijowa. The third inscription, dated Samvat 1184, refers to the death of a Rajput of Nana. The fourth inscription, dated Samvat 1514, records the death of Vir Aidan Singh of Kod, while the fifth one, dated Samvat 1815, refers to the death of Dhun Singh of Bisalpur.

34. NAGARI INSCRIPTION, BELAR, DISTRICT PALI.—This Nagari inscription, dated Samvat 1265, is carved on a pillar. It records the name of the village Belar where the inscription was discovered.

35. COPPER-PLATE INSCRIPTION, SOKRA, DISTRICT PALI.—A ten-lined copper-plate inscrip tion of Samvat 1431 found in the village, records the donation of 7800 *bighas* of land to Rajpurohita Brahmins by the Maharaja of Udaipur.

TAMIL NADU

36. CHOLA INSCRIPTION, BRAHMADESAM, DISTRICT NORTH ARCOT.—This Tamil inscription is engraved on the south wall of the central shrine in the Chandramaulisvara temple. Dated in the thirteenth regnal year (AD 969) of king Parthivendravarman, it records the gift of 15 *kalanju* of gold for a perpetual lamp by Kambansevan, son of Tiruvegambach-chetti to the deity Pondaiperumal of Rajamalla-chaturvedimangalam in Tiruvegambapuram in Damar-kottam. It further records an agreement entered into by the members of the Erivariyam (tank committee) with the members of the *sabhai* (village assembly) for the supply of one *ulakku* of oil daily to the lamp, as the former had utilized the gold received from the donee for the construc tion of the m'(tank) in stone.

37. CHOLA INSCRIPTION, BRAHMADESAM, DISTRICT NORTH ARCOT.—This Tamil inscription, engraved on the north wall of the central shrine in the Chandramaulisvara temple is dated in the third regnal year (AD 1014-15) of Rajendra I. It records the gift of 90 sheep for a perpetual lamp by Arangan Polandai, a *niyaman-kilan* belonging to *Vellala* community of Karaikkottu-brahmadeyam *alias* Parakramasola-chaturvedimangalam in Damar-kottam in Jayangondasola-mandalam to the deity Pondai-Mahadevar of the village. The gift was entrusted to the hands of Amarayan Aranili *alias* Tiruppondai. The members of the *Ganavariyam* were required to see to the proper maintenance of the lamp.

38. TWO VIJAYANAGARA INSCRIPTIONS, NEMALI, DISTRICT NORTH ARCOT.—Of the two records in Tamil language and characters, engraved on the south wall of the outer *prakara* of the Punnagesvara temple, the first one belongs to the reign of Harihara II and is dated Saka 1309 (AD 1387). This inscription records the gift of some taxes *viz., Nulayam* etc., for a lamp to the deity Punitavanam-udaiyanayanar of Nemali and mentions of *Rajagurukkal* of Vasistha-gotra

The second epigraph belongs to the reign of Devaraya II, and is dated Saka 1370 Vibhava, Mina, be. 13 corresponding to 1448 AD, April 1, Monday. The inscription records the default in

payment of taxes by certain communities and the consequent failure in the conduct of affairs to the deity of Nemali. It further refers to the discontinuance of services in the temple because of the exit of people from the village (probably due to oppression of taxes) and records the royal order to recall the people back to the village and restore the services in the temple from out of the nominal tax levied on them.

39. FRAGMENTARY INSCRIPTION, VANIYAMBADI, DISTRICT NORTH ARCOT.—This inscription in Tamil language and characters of the fourteenth-fifteenth century seems to record a settle ment of some dispute over the sharing of tank-water, probably by the village assembly of Vaniyambadi *alias* Uttamasola-chaturvedimangalam. It further records the gift of 72 *kuli* of land.

40. VIJAYANAGARA INSCRIPTION, VANIYAMBADI, DISTRICT NORTH ARCOT.—Engraved on the south wall of the Alagapperumal temple in Tamil language and alphabet, the inscription belongs to the reign of Sadasivaraya and is dated Saka 1470 (AD 1548). The epigraph records the gift of land by Narasingasiyan, son of Narayanadasan, to the deity Alagapperumal of Tirumalirunjolai, for the merit of the king.

41. CHOLA INSCRIPTION, MALLAI, DISTRICT RAMANATHAPURAM.—This Tamil inscription, engraved on a stone lying before the Nachchiyar Amman temple, is dated in the nineteenth regnal year (AD 1088-89) of Kulottunga I. It records the grant of land to Kallivilagamudeyal in memory of Ambalakuttan who sacrificed his head for curing the disease of Kulottunga Chola Muvaraiyan.

42. PANDYA INSCRIPTION, UNJENAI, DISTRICT RAMANATHAPURAM.—This inscription, engraved on the southern wall at the entrance to the *ardhamandapa* of the Chokkanatha temple, is in Tamil language and characters of the thirteenth century AD. It records the grant of land along with the right of cultivation by the *tanattar* of the temple to Alagiyamanavalap-perumal for food offerings to the deity.

43. KONGU CHOLA INSCRIPTION, MASAKKALIPPATTI, DISTRICT SALEM.—Engraved on a slab preserved in a place called Chettikkadu near the village, this fragmentary inscription in Tamil language and characters belongs to the reign of Vikrama Chola. It records the installation of a Sivalinga.

UTTAR PRADESH

44. INSCRIPTION, KOSI, DISTRICT ALMORA.—An inscription in characters of *circa* seventh century AD mentioning *Hirmavanta sutradhara* was noticed.

45. INSCRIPTION OF KING BHOJA I, DISTRICT KANPUR.—The inscription lies on the ground at the Nonha-Narasimha temple which is about 24 km to the north-west of the town of Kanpur. It is only a fragment of an apparently large Sanskrit inscription which refers to the celebrated king Bhoja I *(c.* AD 836-839) of the Imperial Gurjara-Pratihara dynasty of Kanauj. The reference to an individual called *Shri Subhaditya* in line 6 and also to *Padmaprabha Muni* in line 10 is noteworthy.

ARABIC AND PERSIAN INSCRIPTIONS[1]

BIHAR

1. INSCRIPTION OF THE SULTANS OF BENGAL, DISTRICT PATNA.—A published inscription of Saifud-Din Firuz Shah from Gaur in District Malda, West Bengal {*Inscriptions of Bengal,* vol. IV. p. 131), in the possession of Lala Murlidhar Jalan of Patna, records the construction of a mosque in AH 894 (AD 1489) by Khan-i-A'zam Khaqan-i-Mu'azzam Mukhlis Khan. On examination, it was found to supply a very interesting piece of information to the effect that the builder was *Sarnashin-i-Haram Sara-i-Ali* (chief of the Royal Seraglio).

GUJARAT

2. MISCELLANEOUS INSCRIPTION, DEESA, DISTRICT BANAS-KANTHA.—An epitaph from Deesa places the death of Gauhar Shah, a member of the Banawa mendicant's order, in AH 1286 (AD 1869) at the age of 114 years.

JAMMU AND KASHMIR

3. INSCRIPTION OF THE SULTANS OF KASHMIR, SRINAGAR, DISTRICT SRINAGAR.—A slightly-damaged but unique inscription of Sultan Hasan Shah (AD 1472-84), found at Srinagar, records the construction of a building (obviously, the mosque on which it appears) in AH 877 (AD 1472-73) by one whose name reads like Sara Jusaj (?) Bihishti, *zargar* (goldsmith).

4. MISCELLANEOUS INSCRIPTION, SRINAGAR, DISTRICT SRINAGAR.—An epitaph from Srinagar records the death of Khwaja Shah by drowning in a well in AH 1067 (AD 1652-53).

KARNATAKA

5. MISCELLANEOUS INSCRIPTION, GULBARGA, DISTRICT GULBARGA.—A record on a gun from Gulbarga, assignable to the seventeenth century AD, mentions the name of the piece as *Chahar Mani Adil Shahi* (i.e., with a capacity of four Adil Shahi mounds).

6. MISCELLANEOUS INSCRIPTION, SRIRANGAPATNA, DISTRICT MANDYA.—According to this epitaph, Khadija Bibi, mother of Burhanu'd-Din Shahid (who was a cousin and brother-in-law of Tipu Sultan), died in AH 1196 (AD 1782). The epitaph must have been set up after AH 1205 (AD 1790) when the son obtained martyrdom.

MADHYA PRADESH

7. INSCRIPTIONS OF THE SULTANS OF MALWA, CHANDERI, DISTRICT GUNA.—A damaged and fragmentary inscription from Chanderi dated AH 900 (AD 1494-95) refers to the governorship of Sher Khan. Another epigraph from the same place which is like-wise damaged and has lost considerable portion extols the virtues of the Minister *(Wazir)* Sadr Khan. It is assignable to the sixteenth century AD. A short metrical record, also from the same place, assigns the construction of a building, probably the mosque on which it appears, to the reign of a king whose name is not mentioned. It seems to have been set up in the fifteenth century AD.

[1]Information from: 29, Krishna Kumar, Registering Officer, Uttar Pradesh and the rest Z. A. Desai, Director (Epigraphy) and N. M. Ganam, Superintending Epigraphist, assisted by M. F. Khan, Deputy Superintending Epigraphist, S. S. Husain, M. Y. Quddusi, Senior Epigraphical Assistants and M. I. Quddusi, Epigraphical Assistant. Two hundred thirty-one inscriptions were copied, examined and reported during the year, out of which important ones are noticed here.

8. INSCRIPTION OF THE KHALJIS, JHAGAR, DISTRICT GUNA.—A new epigraph of Alau'd-din Khalji was found at Jhagar. It records the construction of a mosque by Muhammad, son of Mahmud Darwish Multani, in AH 714 (AD 1315), during the governorship of Malik Ikhtiyaru'd-Daulat wa'd-Din Tamur.

9. INSCRIPTIONS OF THE MUGHALS, KALABAG, DISTRICT GUNA.—A metrical epigraph from Kalabag of the time of Shah Jahan states that a mosque, a well and a garden were constructed in AH 1038 (AD 1628-29) by one Mir Abul-Hasan, who, however, having died in the meantime, was buried in the garden itself. Another inscription of the same emperor, also from Kalabag, records the construction of a Jami mosque in AH 1050 (AD 1640-41) by Shaikh Abdu'l-Karim. Two almost identical inscriptions of Aurangzeb from Kalabag records the completion of step-well. One of them appears to be by Qadi Muhammad Fadil, naming it as *Bir-i-Fayyad* (well of Fayyad) after the name of his son Muhammad Fayyad in AH 1103 (AD 1691-92). An undated epigraph of the same king from the same place refers to the construction of step-well by one Bansi Sarraf (money-changer).

10. EPIGRAPH, SIRONJ, DISTRICT VIDISHA.—It is largely a copy of two identical records noticed earlier, from Malhargadh and Bari, both in District Guna *(1977-78,* p. 69). It records the construction of a well by Bahadur Shah, son of Alam Shah, in the thirtieth regnal year of Aurangzeb corresponding to AH 1098 (AD 1686-87). The builder was a grandson of Firuz Shah and great grandson of Qadir Shah, a brother of Tughluq Shah, and independent ruler of Kalpi (in District Jalaun, Uttar Pradesh).

MAHARASHTRA

11. INSCRIPTIONS, BIR, DISTRICT BIR.—On re-examination of a published epigraph from Bir *(Epigraphia Indo-Moslemica,* 1921-22, p. 13, pi. la) it was found, to contain the date of the construction of a well in the time of Jahangir as AH 1036 (AD 1626-27) and not AH 1034 (AD 1624-25) as read earlier. Similarly on re-examination another published inscription of Aurangzeb from Bir *(ibid.,* p. 15, pi. Ic), was found to contain the date as regnal year 24, AH 1091 (AD 1680) and not regnal year 4, AH 1071. One more published record from the same place *(ibid.,* p. 23, pi. VIb), dated in the thirteenth regnal year of Muhammad Shah, AH 1143 (AD 1730-31), has Nibalkar (Nimbalkar) as the surname of the builder, Rao Sultanji.

12. INSCRIPTION, SONGIR, DISTRICT DHULE.—An inscription of the time of Shah Alam II records the construction of an 'Idgah and an endowment of seven *bighas* of land under the village Songir for its maintenance in AH 1189 (AD 1775-76).

13. INSCRIPTION OF MINOR CHIEFS, THALNER, DISTRICT DHULE.—A metrical epigraph of the time of Tukoji I Holkar (of Indore) from Thalner records the construction of an 'Idgah in AH 1201 (AD 1786-87) by Muhammad Sharif, son of Shahji, Secretary *(Dabir)* to the chief and a native of Patan. It was inscribed by one Quraishi.

14. INSCRIPTION OF THE MUGHALS, DISTRICT DHULE.—A record on a gun, now in the Rajwade Samshodhan Mandal at Dhule, reported to have been brought from Fathpur in the same district, is dated in the twelfth regnal year (AD 1616) of Jahangir. It states that the gun was transferred to the charge of Mahmud Baig from that of Bir Singh Deo.

15. MISCELLANEOUS INSCRIPTIONS, KANDHAR, DISTRICT NANDER.—A record from Kandhar, assignable to the seventeenth century, states that the great Sidi Marjan Ulu Khani, the *Hawaladar* of the fort, purchased land and constructed a house thereon. In an epitaph from

the same place, Imam Bakhsh who expired in AH 1303 (AD 1885) is referred to as the custodian of the fort *(Qiladar)* of Kandhar and as having belonged as to the Sata clan of Sind.

16. EPIGRAPH OF AURANGZEB, NANDER, DISTRICT NANDER.—An epigraph of Aurangzeb found at Nander records the completion of a well by Fath Jang Khan in AH 1074 (AD 1663).

ORISSA

17. MISCELLANEOUS INSCRIPTION, CHATRAPUR, DISTRICT GANJAM.—An undated epigraph, assignable to the seventeenth century AD from Chatrapur and stated to have been brought from Ganjam, records the construction of the *sarai* of Khairabad (probably Ganjam was then so named) by Khairat Khan (in all probability identical with a grandee of the court of Abdullah Qutb Shah of Golkonda).

RAJASTHAN

18. EPITAPHS, BARI, DISTRICT DHOLPUR.—A few epitaphs recording the death of persons of different walks of life were found at Bari. Some of the deceased mentioned are: Shaikh Abu Multani (d. AH 949=AD 1542), Shah Quli, son of Baba Dost (d. AH 964=AD 1557), Ismail Khan (d. AH 998=AD 1590), Bibi Jiv (d. AH 1005=AD 1596-97), and Bibi Manjha, daughter of Ismail Khan (d. AH 1013=AD 1604).

19. INSCRIPTION, BARI, DISTRICT DHOLPUR.—This forms a part of a previously-noticed record which refers to the death of Khan-i-Ali Daud Khan who expired in AH 880 (AD 1476). It also records the name of the scribe Ishaq (son of) Sulaiman.

20. INSCRIPTION OF THE SULTANS OF GUJARAT, BHINMAL, DISTRICT JALOR.—A fragmentary epigraph from Bhinmal, of the time of Mahmud Shah I (parts of whose titles have survived) recording some construction, refers to the governorship of Malikush-Sharq Hab (lul-Mulk) and to a nobleman Alual-Mulk (?) *alias* Kalu, son of Sa'dullah.

21. INSCRIPTIONS, BILARA AND JODHPUR, DISTRICT JODHPUR.—A slightly-damaged inscrip tion of Shah Jahan from Bilara records the construction of the cenotaph *(Maqbara)* of Chaudhari (name not legible) and Ganga tank at a cost of Rupees 2501 and Rupees 1501 respectively in AH 1049 (AD 1639) by Lak(h)midas under the order of Maharaj Rao Jaswant Singh (of jodhpur), the work having been supervised by Vitha and executed by Lad Muhammad and Duda, the stone-cutters. The text was inscribed by Arif Muhammad. Another epigraph of the same emperor from Jodhpur, incompletely noticed earlier *(A.R.Ep.,* 1955-56, no. 155 of Appendix D), records the construction of a mosque and an endowment of six shops in AH 1067 (AD 1656-57) by Miyan Sundar.

22. EPIGRAPH, JAITARAN, DISTRICT PALL—An epigraph, recording the construction evidently of the well on which it occurs, by Hafizullah in the forty-third regnal year of Aurangzeb, AH 1110 (AD 1698-99) and during the governorship `*amal)* of Firuz Khan, was found at Jaitaran.

23. INSCRIPTION, ALANPUR, DISTRICT SAWAI MADHOPUR.—An interesting inscription from Alanpur spelt in the text as Alhanpur states that a mosque was constructed and a village was founded (rehabilitated) and endowed for obtaining Allah's favour in AH 896 (AD 1491) during the reign of Ghiyath Shah by Khan-i-A'zam and Khaqan-i-Mu'azzam Zabardast Khan, who

also appointed an *Imam* (Leader of prayers) and men (including custodians) for looking after the mosque. The text was composed by Ahmad and inscribed by Hasan Qazvini.

24. INSCRIPTION, KHILCHIPUR, DISTRICT SAWAI MADHOPUR.—A badly-damaged epigraph of the time of Muhammad Shah, penned by Muhammad Zaman, records the construction of a mosque by a person in AH 1151 (AD 1738-39).

25. EPITAPH, MACHILPUR, DISTRICT SAWAI MADHOPUR.—An epitaph which records the martyrdom of Mir Muhammad Baqir in the forty-eighth regnal year of Aurangzeb, AH 1115-16 (AD 1703-04) was found at Machilpur.

26. EPIGRAPHS, MALARNA DUNGAR, DISTRICT SAWAI MADHOPUR.—The first one records the construction of a mosque in AH 803 (AD 1401); the name of the king seems to have been mentioned but is illegible. The second inscription assigns the construction of a mosque in AH 992 (AD 1584) during the governorship of Nawwab Khan-i-Khanan Mirza Khan to Abdur-Rahman, son of Mahshu Kambunera(?), an inhabitant of Achhera Khokhar, a suburb (now part) of the city of Lahore. The text was inscribed by Chetu Das Karnbuneri. The third epitaph from an European Ismit Filuz (Smith Philliozzet ?), son of Kernal Jan Batist Filuz (Colonel John Baptis Philliozzet ?), Bahadur Barq Jang, records his death in AH 1224, Samvat 1865, (AD 1809).

27. INSCRIPTION OF THE TIME OF AKBAR, SHERPUR, DISTRICT SAWAI MADHOPUR.—A record composed by Muhammad Fakhr and inscribed by Baba Tashkandi, mentions the construction of a mosque and a *sarai* by Maulavi Baba under the orders of Dastam Khan in AH 989 (AD 1581).

UTTAR PRADESH

28. WELL-TABLET, SORON, DISTRICT ETAH.—This is inscribed on a rectangular sandstone tablet, recording the construction of a well by Malik-ush-Sharq Muhammad-bin-Muhammad Qutulugh Khan, in the reign of Ghiyas-ud-din Tughlaq Shah. It was executed by Salar Muhammad Masud Kuhrami in AH 724 (AD 1324).

29. INSCRIPTIONS OF THE MUGHALS, MORNA AND SHIKARPUR, DISTRICT MUZAFFARNAGAR.—A new record of Humayun, dated AH 942 (AD 1535-36), was found at Shikarpur. A published epigraph from Morna {*Proceedings of the Asiatic Society of Bengal,* 1873, p. 142) records the construction of a mosque at a cost of rupees nine thousand only, by Bibi Jhabu in the eighth regnal year of Muhammad Shah, AH 1139 (AD 1726) and not AH 1138 as stated in the above journal.

WEST BENGAL

30. INSCRIPTION OF THE MUGHALS, HARAL, DISTRICT HOOGHLY.—An inscription of the time of Shah Alam I records the construction of a mosque in AH 1121 (AD 1709-10).

III. NUMISMATICS AND TREASURE TROVE[1]

GUJARAT

1. JAINA IMAGE, BHILADI, DISTRICT BANAS-KANTHA.—A metal image of Parsvanatha, belonging to *circa* twelfth century AD, was found as treasure trove.

2. JAINA IMAGES, CHADHIYARDA, DISTRICT MEHSANA.—Three metal images of Jaina *tirthankaras* Santinatha, Parsvanatha and Mahavira, ranging in date from the ninth-tenth to twelfth-thirteenth century AD, were discovered.

3. COINS, BHADARVA, DISTRICT VADODARA.—Ninety-five silver coins with legends in Persian language and dates 1100-1150 in the Hijra era were found in the village in Taluk Savali.

4. STONE SCULPTURE, MAHUVAD, DISTRICT VADODARA.—An image Nataraja was obtained as treasure trove from Mahuvad, Taluka Padara.

5. GADHAIYA COINS, VIYARA, DISTRICT VADODARA.—Three hundred and eight coins in silver were discovered at Viyara, Taluka Vadodara.

JAMMU AND KASHMIR

6. COPPER COINS, ZOORA, DISTRICT KASHMIR.—An earthen jar containing copper coins of the Sultans of Kashmir who ruled from AD 1339 to 1552 was discovered by a peasant while tilling his field in the village Zoora, near Shopian.

7. COINS, MAMAL, DISTRICT PAHALGAM.—Two copper coins, one of Toramana and the other of Sangramaraja, were recovered from the spring of the Mahamalesvara temple at Mamal, close to Pahalgam.

KARNATAKA

8. BRITISH COINS AND GOLD ORNAMENTS, DISTRICT BELGAUM.—One hundred silver coins, one silver bar and two silver *tolabandi* were found as treasure trove. The coins belong to Queen Victoria, Edward VII and George V. Another treasure trove consists of gold ornaments including bangles and rings.

9. VIJAYANAGARA COINS, DISTRICT BELLARY.—Two coins, one each in gold and copper, apart from a few ancient ornaments, were recovered as treasure trove.

---

[1]Information from: 1-5, Department of Archaeology, Government of Gujarat; 6 and *7,* Director, Archaeology and Museums, Government of Jammu and Kashmir; 8-14, Department of Archaeology, Government of Karnataka; 15-18, Department of Archaeology and Museums, Government of Madhya Pradesh; 19, Shobhana Gokhale of the Deccan College Post-graduate and Research Institute; 21 and 22, Narayan Vyas of the Western Circle of the Survey; 20, 23-25, Department of Archaeology and Museums, Government of Rajasthan; and 26 and 27, Directorate of Archaeology, Government of West Bengal.

10. GOLD COINS, DISTRICT CHICKMAGALUR.—Out of fourteen gold coins recovered, twelve are of the Vijayanagara king Krishnadevaraya and one is of Veerarayiphanam.

11. HOYSALA COINS, DISTRICT CHICKMAGALUR.—Two hundred and thirty-six gold coins belonging to the period of Hoysala king Ballala have been collected as treasure trove.

12. GOLD COINS, DISTRICT GULBARGA.—Ten gold coins belonging to the Vijayanagara period, seven hundred and eight gold coins-issues of Ghiyasuddin Balban, Ghiyasuddin Tughlaq, Mohammad bin Tughlaq and Bahmani kings, Byzantine coins (thirty-nine in number) and *padma tankas* (six in number), have been acquired as treasure trove. Apart from these, two gold rings and two gold straps were recovered.

13. SILVER COINS, DISTRICT DAKSHINA KANNADA.—Forty-two silver coins of Queen Victoria were found as treasure trove.

14. GOLD COINS, DISTRICT SHIMOGA.—Twenty-nine gold coins were found. These coins are of Keladi Sadasiva-nayaka, Haider Ali and Vijayanagara rulers.

MADHYA PRADESH

15. COINS, PAGARA, DISTRICT DHAR.—A small vessel containing nine gold coins of the Gupta rulers were collected. One of them bears the name of Kacha.

16. COPPER COINS AND SIGNET RING, NANDUR, DISTRICT RAISEN.—A few inscribed and uninscribed copper coins, ranging from the Maurya to Gupta periods, and a signet ring were collected from the surface. The ring contains the name of the *devdasa* in Gupta characters.

17. GOLD AND SILVER COINS, PEEP ALIA NAGAR, DISTRICT SHAJAPUR.—One gold coin of Udayaditya and eight Indo-Sassanian coins (pl. XXVIII A) were collected by the village Panchayat.

18. COPPER COINS, RUNIJA, DISTRICT UJJAIN.—A few copper punch-marked and cast coins were found on the surface.

MAHARASHTRA

19. SATAVAHANA COINS, DISTRICT NASIK.—Electrum coins of Siri Satakarni and Kochhiputa Satakarni and silver coins of Gautamiputra Satakarni and Vasisthiputra Satakarni have been picked up from the surface. The electrum coins of Siri Satakarni and Kochhiputa Satakarni bear the legends *ratio Siri Satakarni* and *rario Sire Kochchiputasa* respectively.

RAJASTHAN

20. SILVER COINS, GADI, DISTRICT BANSWARA.—Two silver coins of Shah Alam recovered from Gadi are now preserved in the Government Museum, Dungarpur.

21. COPPER COIN, CHITTAURGARH, DISTRICT CHITTAURGARH.—A Muslim copper coin was collected from a rock-shelter in the vicinity of the fort.

22. COPPER COINS, NAGARI, DISTRICT CHITTAURGARH.—Sixteen copper coins including a punch-marked coin were collected from the ancient site at Nagari.

23. COPPER COIN, JAIPUR, DISTRICT JAIPUR.—One copper coin belonging to the Jaipur State was found.

24. SILVER COINS, NAHRI-KA-NAKA, DISTRICT JAIPUR.—Thirteen British Indian coins of Edward VII and George V were acquired.

25. SILVER COINS, SINGWARA, DISTRICT JAIPUR.—A hoard consisting of thirty-two silver coins of the Mughals have been acquired from Singwara. This hoard comprises three coins of Aurangazeb, two of Farrukhsiyar, twenty-five of Muhammad Shah and one each of Shah Alam and Shah Jahan II. The names of the emperors are inscribed on the obverse and the names of the mints on the reverse in Persian legend.

WEST BENGAL

26. GOLD AND SILVER COINS, KANSARIPATTY OF COOCHBEHAR TOWN, DISTRICT COOCHBEHAR.—A hoard (pl. XXIX) of one hundred and forty-one Mughal coins and thirty-seven British coins was acquired. The Mughal coins including ten in gold were issued by Shah Alam II and inscribed in Persian language. Three of the gold coins are dated AH 1202. While on these coins the regnal year appears as nineteen, the silver coins bear the regnal years varying from one to forty-nine. Most of these coins have been issued from Murshidabad, though some have been issued also from Arcot and Farrukhabad. Of the thirty-seven British coins seventeen were issued under the name of King William IV in 1835 and the rest by Queen Victoria in 1840.

27. GUPTA COINS, BOINCHEEGRAM, DISTRICT HOOGHLY.—Seven gold coins of the archer type (pl. XXVIII B and C) have been acquired. Of these, three were issued by king Chandragupta II Vikramaditya, two by Narasimhagupta Baladitya, one by Vainyagupta Dvadasaditya and one by king Skandagupta Kramaditya.

IV. OTHER IMPORTANT DISCOVERIES

GOA, DAMAN AND DIU

1. LATE MEDIEVAL SCULPTURES, AMBAWARI, DIU.—Narayan Vyas and M. M. Hadpad of the Western Circle of the Survey discovered a number of late medieval sculptures in the village. Noteworthy among them are those of Siva, Ganesa, Parvati and Vaishnavi.

2. CHINESE PORCELAIN, DIU FORT, DIU.—Narayan Vyas of the Western Circle of the Survey collected pieces of Chinese porcelain from the Portuguese fort at Diu.

3. LATE MEDIEVAL SCULPTURES, MEHTAWARI, DIU.—Narayan Vyas and M. M. Hadpad of the Western Circle of the Survey discovered three fragmentary late medieval sculptures including an image of Mahishasuramardini in the village.

4. MESOLITHIC SITE, ROCK-SHELTER AND CAVE, GOA.—The Directorate of Archives, Archaeology and Museum, Government of Goa, Daman and Diu, reported the discovery of a Mesolithic site along with a rock-shelter at the village Keri (Taluka Ponda) and an ancient cave at the village Kodar (Taluka Ponda).

5. ANCIENT TEMPLE AND MURALS, GOA.—The Directorate of Archives, Archaeology and Museum, Government of Goa, Daman and Diu, reported the discovery of an ancient temple in Diwadi island. Murals depicting Hindu mythological scenes in folk tradition were noticed in the Mulvir temple at Malpe (Taluka Pernem).

6. INSCRIBED JAINA SCULPTURE, NARVA, GOA.—The Directorate of Archives, Archaeology and Museum, Government of Goa, Daman and Diu, discovered a seated stone image of Parsvanatha with its head broken, in *dhyana-mudra*. The pedestal of the image bears a single-lined inscription in Nagari script with specific date *Veeranivana samvatsara 1007* (AD 1150). Thus, it is clear that it belongs to the reign of the Kadamba king Sivachitta Permadi Tribhuvanamalla *(circa* AD 1147-1181).

GUJARAT

7. EARLY MEDIEVAL SCULPTURES, VADODARA, DISTRICT VADODARA.—B. L. Nagarch of the Western Circle of the Survey discovered a stone sculpture of Lakulisa and other fragmentary Saiva sculptures datable to *circa* eighth century AD in the compound of the Lakshmi Vilas palace at Vadodara.

8. MEDIEVAL SCULPTURE, VADODARA, DISTRICT VADODARA.—B. L. Nagarch and Narayan Vyas of the Western Circle of the Survey noticed a medieval sculpture of a four-armed seated female deity near Sursagar.

HARYANA

9. BRONZE IMAGES, HANSI, DISTRICT HISSAR.—A copper jar containing fifty-seven bronze, copper and iron objects was discovered in the centrally-protected fort at Hansi. The finds consist

of mainly images of Jaina *tirthankaras,* ranging in date from the seventh-eighth to the thirteenth century AD. Some of them also bear inscriptions (pl. XXX).

HIMACHAL PRADESH

10. LATE MEDIEVAL FORT, DISTRICT SOLAN.— A. K. Patel and Pramod Singh of the North western Circle of the Survey noticed a ruined fort and two cannons of late medieval period. It is located on the top of a hill of the Siwalik range, to the west of the village Malaun (Tahsil Nalagarh).

JAMMU AND KASHMIR

11. EARLY HISTORICAL SITE, NAGABAL, DISTRICT ANANTNAG.—G. S. Gaur of the North western Circle of the Survey discovered a series of mounds at Nagabal. Of these, seven mounds yielded pottery and antiquities of the Kushana period.

12. WALL-PAINTINGS, SASPOL, DISTRICT LEH.—S. N. Kesarwani, A. K. Patel, Pramod Singh and H. L. Raina of North-western Circle of the Survey noticed a number of caves, of which one contains paintings of the Buddhist pantheon, datable to fourteenth-fifteenth century AD.

13. NEOLITHIC SITE, SHAHPENDU, DISTRICT PULWAMA.—G. S. Gaur of the North-western Circle of the Survey discovered a neolithic site yielding burnished coarse grey ware and combed ware.

14. TERRACOTTA PLAQUE, HAWAL, DISTRICT SRINAGAR.—The Directorate of Archives, Archaeology and Museum, Government of Jammu and Kashmir, discovered a fragmentary terracotta plaque depicting a two-armed standing Buddhist goddess holding a book and an unidentified object in her hands. A triple-based stupa is seen on her left side.

15. DECORATED POTTERY, SAURA, DISTRICT SRINAGAR.—The Directorate of Archives, Archaeology and Museum, Government of Jammu and Kashmir, noticed cups-on-stands and plates. Some of the potsherds bear stamped designs comprising geometrical and floral patterns, pair of swans, erotic figures, elephant-rider with an arrow, a lion with a man and a couple playing musical instruments at the ancient site at Saura, which had earlier yielded terracotta plaques and Buddhist sculptures datbale to ninth-tenth century AD.

KARNATAKA

16. ANCIENT SITE, TEMPLES AND HERO-STONES, DISTRICT BANGALORE.—The Directorate of Archaeology and Museums, Government of Karnataka, reported the discovery of Somesvara temple at Madiwala (Taluka Bangalore). The temple in Chola style is a *nirandhara triratha vesara vimana;* the temple consisting of the *garbha-griha, antarala* and *sabha-mandapa* as well as a separate shrine for Devi are all enclosed within a *prakara.* There are inscriptions in Tamil characters of the thirteenth-fourteenth century AD on the *adhisthana* and walls. The temple contains stone sculptures, bronzes and metallic lamps. Further, an ancient site and four temples were discovered at Heggunda in Taluka Nelamangala. The ancient site yielded black-and-red ware, red and black wares of Megalithic-early historical period both at the foot and the top of the hill. Of the four temples, the Hanuman temple and three hero-stones, are at the foot of the hill, two cave-temples with brick walls, named Mallikarjuna and Virabhadra, halfway up the

hill and the Rama temple on the top of the hill. Four more temples, namely Akka Tangi, Kapileswara, Somesvara and Sulera, as well as several sculptures of the Ganga period were noticed at Manne in Taluka Nelamangala.

17. STONE AGE, MEGALITHIC AND EARLY HISTORICAL SITES, DISTRICT BELLARY.—C. B. Patil of the Mid-southern Circle of the Survey discovered microlithic sites at Bairavalli, Chanduru, Hirekal and Hosahalli. The collection included parallel-sided blades, with or without retouch, fluted cores and flakes made on jasper. Neolithic sites at Chanduru, Hirekal, Hosahalli, Rayapuram and Samjivarayanakote yielded ground and polished tools and burnished grey ware. Megalithic burials were noticed at Byranayakanahalli and Sanjivarayanakote; the burials at the former place are cairn circles, while those at the latter are of the passage chamber type. A boulder on the top of the Kardikola hillock to the south-east of Byranayakanahalli bears the figures of animals like horse, deer and tiger. Typical Satavahana pottery was recovered at Chanduru.

The Directorate of Archaeology and Museums, Government of Karnataka, reported a Neolithic-Megalithic site to the south-west of the village Balakundi and on the other side of the hill. Another Neolithic-Megalithic site was noticed near the village Hirehalu on the right bank of the Hagari.

18. TEMPLES, TALIKOTA, DISTRICT BIJAPUR.—The Directorate of Archaeology and Museums, Government of Karnataka discovered at Talikote in Taluka Muddebihal two temples, known as Ramadeva and Siddalinga, ascribable to *circa* twelfth century AD.

19. TEMPLE, BAGGAVALLI, DISTRICT CHIKMAGALUR.—The Directorate of Archaeology and Museums, Government of Karnataka discovered Yoga-Narasingha temple of the Hoysala period. It consists of three *garbha-grihas, navarangas* and an open multi-pillared *mukha-mandapa.*

20. TEMPLES, TINTHINI, DISTRICT GULBARGA.—The Directorate of Archaeology and Museums, Government of Karnataka, discovered three temples known as Isvara, Lakkamma and Virabhadra at Tinthini (Taluka Shorapur) datable to the tenth-eleventh century AD. There is a *pitha* of Traipurusha in a field where a set of copper-plates of the Kalyani Chalukya king Jayasimha II was recently found.

21. NEOLITHIC-MEGALITHIC SITE AND JAINA TEMPLE AT ANKANATHAPURA, DISTRICT HASSAN.—The Directorate of Archaeology and Museums, Government of Karnataka, discovered a Neolithic-Megalithic site inside a mud fort on the bank of the river Hemavathi. Remains of a Jaina temple were exposed while digging a new canal inside the fort.

22. NEOLITHIC-MEGALITHIC AND EARLY HISTORICAL SITES, DISTRICT KOLAR.—G. S. Narasimhan of the Mid-southern Circle of the Survey discovered Neolithic sites at Arabikotanur, Paparajanahalli and Terahalli yielding handaxes, buff ware, grey ware, red ware and both burnished and unburnished grey ware. Besides, three more sites at Dhanamattanahalli, Kuppalli and Naganala yielded Neolithic handaxes with a blunt butt and lenticular section. Megalithic habitation-sites yielding black ware, red ware and Black-and-red Ware were discovered at Hogari, Kendatti and Naganala. In addition, a number of Megalithic stone circles with or without cairn packing were noticed at Alahalli, Appayyana Agrahara, Bairandoddi, Bandhatti, Bittanahalli, Chikkalhalli, Denavahalli, Halehalli, Shamesettihalli, Upparahalli, Venkatapura and Vobanhatti Agrahar in Taluka Malur and Arabikottanuru, Bettakallahalli, Chokpura, Danamattihalli, Dinnehalli, Dinnehosahalli, Dodvallabi, Gutthalli, Hogari, Hogarigollahalli, Hullinakallu, Juvahalli, Kallahalli, Kilukota, Kolar, Kurugallu, Malyappanahalli, Paparajanahalli, Perijana-

halli, Perijanahalli, Sungondahalli and Terahalli in Taluka Kolar. The cists, with a circular or semi-circular port-hole on the eastern orthostat, are oriented east-west. The orthostats are arranged in the *svastika* pattern in anti-clockwise. The sites at Alahalli and Bettanahalli are very extensive and have more than two hundred circles each. Early historical sites yielding black ware, red ware and black-and-red ware were noticed at Dimba, Dhanamattanahalli and Gutthalli.

23. MEGALITHIC AND EARLY HISTORICAL SITES, DISTRICT SHIMOGA.—Hanumantappa Telugu of the Mid-southern Circle of the Survey discovered Megalithic burial sites at Chinukatte, Hanumahalli and Kammaragatte in Taluka Honnali. The types correspond to stone and cairn circles. Early historical sites were noticed at Govinkovi, Konaikanahalli, Kotehalu, Narasagondanahalli and Soratur.

KERALA

24. INSCRIPTIONS, DISTRICT IDUKKI.—Raman Namboodiri of the Southern Circle of the Survey noticed old Tamil inscriptions on granite slabs of the compound wall of a temple complex on the top of the Mangaladevi hill, about 14 km east of Kumalay. The inscriptions are assignable to the thirteenth-fourteenth century AD. He further discovered inscriptions in old Tamil and old Malayalam respectively at Karikode Bhagavati and Sri Krishnasvami temples in Taluka Thodupuzha.

MADHYA PRADESH

25. PRATIHARA SCULPTURES AND PALAEOLITHIC TOOLS, BHOPAL.—C. Krishna and Rajaram Singh of the Department of Archaeology and Museums, Government of Madhya Pradesh, discovered ancient temple sites at Beta and Lahokhedi. A few sculptures of the Pratihara period were found at the mound. A good number of stone tools of Series I and II were collected near the mound.

26. STURDY RED WARE, NAVADA TOLI, DISTRICT EAST NIMAR.—S. A. Sali of the Central Circle of the Survey during his visit to Navada Toli collected a thick sturdy red ware of fine fabric showing close similarity with the late Harappan red ware of the central Tapi basin.

27. PALAEOLITHIC, EARLY HISTORICAL AND MEDIEVAL SITES, DISTRICT GUNA.—O. P. Misra of the Department of Archaeology- and Museums, Government of Madhya Pradesh, found a Middle Palacolithic site at Vijaipur-Dongar, near Guna. The tools included scrapers and blades made on carnelian and jasper. An early historical site yielding pottery, terracotta beads, bangles and ring-wells was also discovered at Maloni. He further noticed Jaina and Brahmanical architectural remains and sculptures datable to the tenth-eleventh century AD in the Rajghat Dam submergence area, near Chanderi. The images include Vishnu, Uma-Mahesvara, Mahishasuramardini, Ganesa and Jinas.

V. S. Wakankar, Bharti Joshi and O. P. Misra discovered Lower Palaeolithic tools at Parvati. The tools include choppers, side-scrapers and blades made of Deccan trap and Middle Palaeolithic tools of sandstone, chert, jasper and agate.

28. STONE SCULPTURE, DISTRICT HOSHANGABAD.—M. K. Maheshwari of the Department of Archaeology and Museums, Government of Madhya Pradesh, discovered an image of Kamadeva. It is now displayed in Vidisha Museum.

29. CHALCOLITHIC SITES AND ROCK-CUT CAVES, DISTRICT MANDASOR.—C. Krishna of the Department of Archaeology and Museums, Government of Madhya Pradesh, discovered mounds at Muala and Sitamau yielding Chalcolithic pottery, terracotta animal figurines and blades. He also noticed rock-cut caves at Polodonger near the Garot village. One of the caves is a *vihara* containing a *chaitya* as well.

M. K. Maheshwari and Prakashendra Mathur of the above Department discovered a Palaeolithic site at Batrata.

30. PAINTED ROCK-SHELTER, KOTRA VIHARA, DISTRICT RAJGARH.—C. Krishna and a team from the Department of Archaeology and Museums, Government of Madhya Pradesh, noticed a group of rock-shelters bearing paintings depicting both human and animal figures.

31. ARCHITECTURAL REMAINS, BINABARAHA, DISTRICT SATNA.—A team of the Department of Archaeology and Museums, Government of Madhya Pradesh, discovered architectural remains of the tenth-eleventh century AD at Binabaraha.

MAHARASHTRA

32. ROCK-CUT CAVES, LOHAGADNANDRA, DISTRICT AURANGABAD.—Y. V. Sonegirkar and T. M. Keshava of the South-western Circle of the Survey located rock-cut caves with triple shrine and *nandi-mandapa* dedicated to Saiva pantheon, datable to the Yadava period.

33. ROCK-CUT CAVES, NAGAD, DISTRICT AURANGABAD.—T. M. Keshava of the South western Circle of the Survey reported an unfinished group of caves of the Yadava period at Mahadeva Taka.

34. EARLY HISTORICAL SITE, DEULGAON RAJA, DISTRICT BULDHANA.—R. C. Agrawal of the South-western Circle of the Survey collected terracotta votive tank, stone pestle and sherds of black-and-red ware belonging to the Satavahana period from the section-cutting of a conspicuously high mound.

35. SCULPTURES, DHOTRA, DISTRICT BULDHANA.—R. C. Agrawal and Amarendra Natli of the South-western Circle of the Survey noticed sculptures of Chamunda, Ganapati, Bhairava, Uma-Mahesvara and Parvati, fragments of door-frames with male and female figures and a monolithic jar belonging to the Yadava period.

36. SCULPTURES, KOTHALI, DISTRICT BULDHANA.—R. C. Agrawal and Amarendra Nath of the South-western Circle of the Survey noticed a monolithic elephant belonging to the Yadava period.

37. EARLY HISTORICAL SITE, LONAR, DISTRICT BULDHANA.—R. C. Agrawal of the South western Circle of the Survey collected shell bangles and sherds of red ware associated with black-and-red ware of the Satavahana period near Lonar.

38. EARLY HISTORICAL SITE, SINDKHED RAJA, DISTRICT BULDHANA.—R. C. Agrawal of the South-western Circle of the Survey collected sherds of red ware associated with black-and-red ware of the Satavahana period. He also picked up stone pestles and noticed brick structures as well as sculptures of Siva-Parvati, Ganesa, Parsvanatha, Nandi, Varaha and Seshasayi Vishnu kept near a modern temple, apart from a sculptured well, outside the village, having series of sculptures belonging to the Yadava period.

39. SCULPTURES AND POTTERY, TARAPUR, DISTRICT BULDHANA.—R. C. Agrawal and Amarendra Nath of the South-western Circle of the Survey noticed sculptures of Lajja-Gauri, Siva and Parvati, ascetics, *viragals, naga-stones,* male heads and an isolated cubical column having figures of females, horse-riders and devotees belonging to the Yadava period. Besides, they noticed a temple with the sanctum and *mandapa* built in stone and *sikhara* in brick, also belonging to the Yadava period. Further, they collected sherds of bowls and sprinklers of red polished ware belonging to early historical period.

40. EARLY HISTORICAL SITE, BHANDAK, DISTRICT CHANDRAPUR.—R. C. Agrawal and Amarendra Nath of the South-western Circle of the Survey collected stone saddle-quern, terra cotta hopscotch and sherds of black-and-red ware belonging to the Satavahana period.

41. MIDDLE STONE AGE TOOLS, RAMDIGI, DISTRICT CHANDRAPUR.—R. C. Agrawal and Amarendra Nath of the South-western Circle of the Survey collected scrapers and blades made on milky chalcedony and green and red jasper. The tools collected were found embedded in black cotton soil mixed with *murratn.*

42. RUINED HEMADPANTI SIVA TEMPLE, CHAVALDA. DISTRICT DHULE.—L. S. Rao of the South-western Circle of the Survey noticed a dilapidated Hemadpanti temple of the Yadava period.

43. MIDDLE STONE AGE TOOLS, HINGANA, DISTRICT NAGPUR.—R. C. Agrawal and Amarendra Nath of South-western Circle of the Survey collected borer-cum-scrapers, side scrapers, scrapers, triangles, arrowheads, fluted cores and discoidal cores made on green jasper and chalcedony embedded in black cotton soil mixed with kankar. The collection has an affinity with the Wainganga industry.

44. EARLY HISTORICAL SITE, NAGARDHAN, DISTRICT NAGPUR.—R. C. Agarwal and Amarendra Nath of South-western Circle of the Survey collected terracotta animal figurine, fragment of a soapstone bowl, stone pestle, hopscotch, spindle-whorl and sherds of incurved bowl, carinated *handi* and miniature pots with mica dusting belonging to the early historical period. Besides, a fragment of a stone pestle, ill-burnt terracotta cake and a sherd associated with late Harappan culture were also picked up.

45. HEMADPANTI TEMPLE, BHATGALI, DISTRICT OSMANABAD.—S. N. Raghunath of the South-western Circle of the Survey noticed a Hemadpanti temple datable to the twelfth century AD.

46. CHALCOLITHIC SITES, DISTRICT OSMANABAD.—S. N. Raghunath of the South-western Circle of the Survey noticed Chalcolithic sites with scanty Jorwe pottery at Bhoom and Karanje.

47. TEMPLES, STEPPED WELL AND MOSQUE, KATI, DISTRICT OSMANABAD.—D. M. Kulkarni of the South-western Circle of the Survey noticed temples dedicated to Siva, one stepped well and sculptures of Siva, Ganesa and Vishnu of the Yadava period. Besides, a mosque of Adil Shahi period was also noticed.

48. BUDDHIST CAVES, KHADSAMALA, DISTRICT RAIGAD.—The Buddhist caves at Khadsamala, first noticed in the year 1881 by H. Cousens and falling in the same geographic setting as Thanala, were visited by M. N. Deshpande of Nehru Centre, Bombay, along with R. G. Pandeya of the Survey. The main cave was cleared of the debris with the cooperation of the

Survey and it was observed that the *vihara-cum-chaitya* cave has some features, similar to Cave 7 at Thanala. Fresh study revealed that the cave contained a stupa (indicated by the hollow portion on the ceiling to accommodate the *anda* portion and a hole in the centre thereof for the *yashti* and a few cells for monks. It was, however, enlarged after removing the stupa and the cells situated on the southern part of the cave and a large *vihara* with seventeen cells was fashioned together with a vaulted and astyler *chaitya-griha* into the rear of the cave, on the northern side. The cave had elaborate wood-work on the facade and partitions, of which indications by way of sockets exist both on the floor and the ceiling.

Another cave containing two memorial stupas, and yet another having traces of painted plaster retaining bands of red, black and white colour were noticed.

About a quarter kilometer from the main group, on the southern side another group of five *viharas,* locally called Chamar lena, was noticed. The frontage of these caves has suffered damage as a result of the fall of the rock-facade. There is vet another cave, not far from the main group, to its south-east in the rock escarpment of a hill, known as Ganasurat.

49. VAJRAYANA STUPAS, PALE, DISTRICT RAIGAD.—Originally excavated by the Hinayanists, the Buddhist group of caves at Pale near Mahad was augmented and enlarged by the Mahayanists around the fifth century AD. Fresh study undertaken by M. N. Deshpande of Nehru Centre, Bombay, brought to light evidence of the occupation of these caves in the tenth-eleventh century by the Vajrayanists who erected loose rock-cut stupas, two of which were seen lying at the foot of the hillside containing the caves. One of the two stupas had to be cleared to know its shape and character. The Pale group thus gets connected with Kanheri and Kondivte in the north and Panhale Kaji in the south, where similar stupas erected during Vajrayana occupation were noticed. (The Vajrayana stupa at Kondivte is now under worship near the cave site).

50. ANTIQUITIES, KUSHAVART TANK, RAIGAD FORT, DISTRICT RAIGAD.—A. N. Mohite of South-western Circle of the Survey recovered sculptures of Nandi, golden talisman and the tiny silver lid of a perfume bottle, during the desilting of the Kushavart tank at Raigad fort.

51. PANHALE KAJI CAVES, DISTRICT RATNAGIRI.—A study of the Panhale Kaji caves under taken by M. N. Deshpande of Nehru Centre, Bombay, revealed that the cave-excavation activity at this place started in the Hinayana phase *(circa* third century AD) when a stupa in alto-relievo was carved in Cave 5. This has been partially chiselled out some time later, which is enough to show its relationship with a similar stupa in the Chaul cave group. Later, the site became a stronghold of the Vajrayana sect in *circa* tenth-eleventh century AD when the earlier caves were appropriated for the worship of deities like Akshobhya and Mahachandaroshana (Cave 10). Immediately following this change the caves were used for Ganapatya and Saiva worship during the Silahara period. In Cave 19 which contains a monolithic *linga*-shrine in the interior of the hall, there are ceiling-panels containing the *Ramayana* and the *Mahabharata* scenes. In Caves 14 and 29 (the latter known as Gaura-Lena) there is a very clear evidence of the earlier caves being used for the worship of the deities of the *Natha-pantha.* Cave 29, besides containing a composite panel with images of Matsyendranatha, Adinatha and Uma has sculptured representations of Goraknatha and Maha-Tripurasundari, the latter answering to the description in the *Lalitasahasranama.* Inside the cave, on the walls are depicted 84 *siddas* in small panels. Among these can be identified one of Chauranginatha because of the additional depiction of his severed hands and feet. He is also represented in the Cave 14. This cave (Gaura-Lena) also contains, on the outside, opposite the cave entrance, sculptures of Ganesa flanked by Lakshmi and Sarasvati. Outside the cave are carved, in two large niches, sculptures of Hanuman and Bhairava.

The existence of the cult-image of Maha-Chandraroshana in the Cave 10 is very significant and bespeaks of the contact of Konkana with Ratnagiri, a Buddhist site in Orissa where this deity is depicted on a stupa.

52. PALAEOLITHIC TOOLS, DISTRICT SHOLAPUR.—S. N. Raghunath of the South-western Circle of the Survey noticed Middle Stone Age tools including scrapers and points on yellow and green jasper at Kurkudi. Besides, he also reported a microlithic open-air site yielding flakes, blades and scrapers made on chalcedony.

53. BUDDHIST CAVE, LONAD, DISTRICT THANA.—M. N. Deshpande of Nehru Centre, Bombay, identified on the architrave of the cave at Lonad a narrative scene of the *Vessantara Jataka* together with panels of Hariti and Panchika, thereby establishing conclusively the Buddhist affiliation of the cave. The cave can be attributed to the fifth century AD.

As a result of clearance undertaken by A. P. Jamkhedkar, Director of Archaeology & Museums, Government of Maharashtra, details of the moulded plinth of the cave were brought to light. The central doorway leading to the interior hall is flanked by caryatid Yaksha images.

A large panel on the right side of the cave, outside the verandah, appears to be a magnification of the scene on the architrave, where Vessantara's father is depicted seated on a high seat amidst courtiers and attendants taking the fateful decision to banish the prince Vessantara.

54. SCULPTURES, KELJHAR, DISTRICT WARDHA.—R. C. Agrawal and Amarendra Nath of the South-western Circle of the Survey noticed the sculptures of Jaina and Hindu pantheons. The noteworthy amongst them are Parsvanatha, Neminatha, hero-stones depicting Surya-Chandra, *linga* and pillars having *tirthankara* figures.

55. ANCIENT SITE, PAUNAR, DISTRICT WARDHA.—R. C. Agrawal and Amarendra Nath of South-western Circle of the Survey collected sherds of black-polished ware and black-and-red ware of the Chalcolithic period from a section of a mound near Seva Ashram.

56. EARLY HISTORICAL SITE, DARWAH, DISTRICT YAVATMAL.—R. C. Agrawal of the South western Circle of the Survey collected stone pestles, sherds of black-and-red and plain red wares of the Satavahana period from a mound called Gadi.

57. EARLY HISTORICAL SITE, KALAMB, DISTRICT YAVATMAL.—R. C. Agrawal of the South western Circle of the Survey collected sherds of black-and-red ware, red-slipped ware, coarse red ware, red micaceous ware and two thin black-and-red ware sherds with graffiti belonging to the early Satavahana phase.

58. SCULPTURES, LOHARA, DISTRICT YAVATMAL.—R. C. Agrawal of the South-western Circle of the Survey noticed a number of sculptures belonging to the Yadava period. Noteworthy amongst them are those of Sarasvati, a royal personage, Siva and Parvati, ascetic, Nandi and a *viragal.*

PUNJAB

59. ROCK-CUT CAVES AND INSCRIPTION, DOONGE, DISTRICT GURDASPUR.—A. K. Patel and Pramod Singh of the North-western Circle of the Survey noticed remains of four Brahmanical rock-cut caves of the Gupta period at Doonge in Tahsil Pathankot. One of the caves bears an inscription of four lines in Brahmi script which is engraved on the left side of the doorway.

60. MEDIEVAL SCULPTURE, MARADKHERA, DISTRICT SANGRUR.—J. M. Thapar of the North-western Circle of the Survey noticed a rare image of the Sun god in white sandstone, datable to *circa* eleventh-twelfth century at Maradkhera. It was discovered while digging a mound by villagers just opposite to the locality.

61. ANCIENT PILLAR AND DOOR-JAMBS, SUNAM, DISTRIT SANGRUR.—J. M. Thapar of the North-western Circle of the Survey noticed a carved brick pillar of the post-Gupta period at Sunam. It was discovered while digging the mound by villagers at the place known as 'Ganj Sheedan'. Besides, there are two pieces of fragmentary stone door-jambs belonging to *circa* tenth-eleventh century AD.

RAJASTHAN

62. LOWER PALAEOLITHIC TOOLS, GARH (NEELKANTH), DISTRICT ALWAR.—R. P. Sharma, B. P. Saxena, D. P. Sinha and A. K. Khanna of the Delhi Circle of the Survey explored the Neelkanth valley and found Lower Palaeolithic tools comprising Acheulian handaxes and a cleaver along the foothills.

63. PILLARED DOME, MANDAL, DISTRICT BHILWARA.—R. Pathak of the Western Circle of the Survey noticed a 32-pillared dome dated AD 1615 at the village Mandal.

64. EARLY HISTORICAL SITE, GUJARON-KA-KHERA, DISTRICT CHITTAURGARH.—Narayan Vyas, S. R. Shrimali and M. M. Hadpad of the Western Circle of the Survey noticed an early historical site yielding ancient pottery, a fragmentary terracotta bangle and a stone quern.

65. ANCIENT TEMPLE, JAI, DISTRICT CHITTAURGARH.—Narayan Vyas, S. R. Shrimali and M. M. Hadpad of the Western Circle of the Survey noticed a ruined Brahmanical temple datable to *circa* seventh century AD.

66. BRAHMANICAL SCULPTURES, MANGALWARA, DISTRICT CHITTAURGARH.—Narayan Vyas and M. M. Hadpad of Western Circle of the Survey discovered sculptures of standing Ganesa, Parvati, Chaturmukha *Siva-linga* and Nandi assignable to *circa* eighteenth century AD.

67. SCULPTURES, RATANPUR, DISTRICT JHALAWAR.—The Department of Archaeology and Museums, Government of Rajasthan, reported the discovery of sculptures including Kalyanasundara, Nataraja and head of a Jaina *tirthankara* ranging in date from the ninth to twelfth century AD.

68. JAINA SCULPTURES AND BRONZES, JHUNJHUNU, DISTRICT JHUNJHUNU.—R. C. Agrawala, the former Director of Archaeology and Museums, Rajasthan, discovered medieval Jaina sculptures and bronzes in the Svetambara temple. A small bronze image of goddess Achyupta riding on a horse, carries a bow and a shield in her hands. The pedestal of the image bears some Kutila letters, suggesting early Pratihara date (seventh-eighth century AD).

69. MEDIEVAL TEMPLE, CHANDRESAL, DISTRICT KOTA.—R. Pathak of the Western Circle of the Survey discovered a Siva temple datable to *circa* tenth century AD. The temple is situated on the bank of the river Chandoli.

70. MEDIEVAL TEMPLE AND SCULPTURES, RAMPURIA, DISTRICT KOTA.—T. Satyamurthy and Narayan Vyas of the Western Circle of the Survey noticed a ruined temple and sculptures

in the vicinity of the village. Important among the sculptures at the site is a bust of Siva and a sculpture of Ganesa (pl. XXXI).

71. SCULPTURE, DHALOP, DISTRICT PALI.—R. Pathak of the Western Circle of the Survey discovered a fragmentary sculpture of Brahma assignable to *circa* fourth century AD.

72. TERRACOTTA, MORKHA, DISTRICT PALI.—R. Pathak of the Western Circle of the Survey collected a fragmentary terracotta horse belonging to the early medieval period from the site.

73. PAINTINGS, NARLAI, DISTRICT PALI.—R. Pathak of the Western Circle of the Survey noticed paintings on the wall of a Siva temple belonging to *circa* eighteenth century AD.

74. MEDIEVAL TEMPLE, KAILASHPURI, DISTRICT UDAIPUR.—Narayan Vyas and M. M. Hadpad of the Western Circle of the Survey noticed a ruined temple in the vicinity of Kailashpuri.

UTTAR PRADESH

75. EARLY HISTORICAL SITE, DAUKI, DISTRICT AGRA.—Krishna Kumar, Registering Officer, Agra, noticed an ancient mound at Dauki on Agra-Fatehabad Road, 23 km from Agra. The mound, supporting a modern shrine, yielded sherds of the Painted Grey Ware and red ware.

76. EARLY AND LATE HISTORICAL SITE, JAIGARA, DISTRICT AGRA.—Krishna Kumar, Registering Officer, Agra, discovered a high mound at Jaigara on Kiraoli-Kagarol Road, 30 km from Agra. The mound, supporting the ruins of a mud fort of the late medieval period, yielded sherds of the Painted Grey Ware and red ware.

77. EARLY HISTORICAL SITE, MAHUWAR, DISTRICT AGRA.—Krishna Kumar, Registering Officer, Agra, discovered a high mound at Mahuwar on Agra-Fatehpur Sikri Road, 25 km from Agra. The mound, bearing a modern Hanuman temple on its top, yielded sherds of the Painted Grey Ware and red ware.

78. MEDIEVAL SCULPTURES AND POTTERY, SADARBAN, DISTRICT AGRA.—Narayan Vyas and C. P. Singh of the Northern Circle of the Survey noticed a number of medieval sculptures belonging to Jaina and Hindu pantheons besides medieval pottery in the vicinity of the village.

79. EARLY AND LATE HISTORICAL SITE, SARWARA KHERA, DISTRICT AGRA.—Krishna Kumar, Registering Officer, Agra, discovered a high mound at Sarwara Khera on Agra-Samsabad Road, 18 km from Agra. The mound, bisected by the road, yielded sherds of the Painted Grey Ware, red ware, black-polished ware and the glazed ware.

80. EARLY HISTORICAL SITE, SONOUTHI, DISTRICT AGRA.—L. M. Wahal of the Northern Circle of the Survey discovered Painted Grey Ware, fine grey ware, Northern Black Polished Ware, black-slipped ware and red ware of the Sunga and Kushana periods at Sonouthi.

81. EARLY HISTORICAL AND MEDIEVAL SITE, TARFARA, DISTRICT ALIGARH.—L. M. Wahal of the Northern Circle of the Survey discovered black-slipped, fine grey and red wares of the Kushana and medieval periods as also the Muslim glazed ware from a site situated in the village.

82. EARLY MEDIEVAL TEMPLE, KAPILESHWAR, DISTRICT ALMORA.—Maheshwar P. Joshi of Kumaun University, Almora, discovered a pyramidal shrine measuring approximately 12 m in height and two smaller shrines having a *tri-ratha* plan. The *sukanasa* of the pyramidal shrine, partly ruined, bears Nataraja flanked by Ganga and Yamuna and Saiva-*ganas* engaged in dancing or playing on musical instruments. On the right side of the front wall of this shrine there is an inscription recording the name of one *Kapardasila Dhairdichanu* in characters of the seventh-eighth century AD. The plain *mandovara* of this shrine is provided with a *rathika* surmounted by an *udgama* pediment on each side wherein sculptures representing Mahishasura-mardini, Lakulisa and Ganesa as *parsva-devatas* are *in situ.* The two smaller shrines also bear images of Natesa, Vishnu and other deities.

83. DEPRESSIONS ON ROCKS OR BOULDERS AND POTTERY, DISTRICTS ALMORA, NAINITAL AND PITHORAGARH.—-Maheshwar P. Joshi of Kumaun University noticed a fairly large number of depressions, both shallow and deep on rocks or boulders at Ghitai, Deoli-Danda, Kalamati, Khaikhan, Mall Painuli, Naugaon, Phalsima and Simalti, in District Almora, and Mukteshwar and Negi Udyar, in District Nainital. Typologically these may be divided into following five categories; (i) dot-like depressions often in rows of three and four; (ii) smaller circular depressions measuring 2 to 8 cm in diameter and 1 to 10 cm in depth; (iii) rectangular depressions measuring 5 to 10 cm on sides and 2 to 10 cm in depth; (iv) cup-like depressions having an average size of 15 cm in diameter and 25 cm in depth; and (v) snake-like depressions. He also picked up pottery and bricks at Ghitai, Naugaon and Takula in district Almora and Champawat in district Pithoragarh. At Naugaon a sherd of grey ware bearing incised 'combed' design and graffiti mark(?) was also found.

84. MEDIEVAL TOMBS, PILANI, DISTRICT BANDA.—D. Bhengra of the Mid-eastern Circle of the Survey discovered two tombs of the medieval period.

85. EARLY HISTORICAL AND MEDIEVAL POTTERY, FATEHGANJ, DISTRICT BAREILLY.—L. M. Wahal, C. P. Singh and Vinod Kumar of the Northern Circle of the Survey discovered fine grey, black-slipped and red wares of early historical period, besides medieval glazed ware from a mound situated in the village.

86. EARLY POTTERY, LAJPAT PURI, DISTRICT BULAND SAHAR.—C. P. Singh of the Northern Circle of the Survey discovered sherds of grey ware and a solitary fragment of a dish-on-stand from a mound at Lajpat Puri.

87. SCULPTURES, TIRUPATTI, DISTRICT DEORIA.—H. K. Narain and B. Nath of the Mid-eastern Circle of the Survey discovered two images of Surya, one belonging to the late Gupta period and the other to the Pala period, from a mound.

88. ANCIENT SITE, SURIKH, DISTRICT FARRUKHABAD.—L. M. Wahal of the Northern Circle of the Survey discovered Painted Grey, fine grey, Northern Black Polished Wares besides red ware of early historical period from an ancient site situated at the village Surikh.

89. BRICK TEMPLE, DHAMNA KHURD, DISTRICT FATEHPUR.—Krishna Kumar, Registering Officer, Agra, noticed a damaged brick temple in the village Dhamna Khurd, about 4 km west of Amauli Block. The uppermost portion of the curvilinear *sikhara,* embellished with *chandra-salas* and *bhumi-amalakas,* is lost. Besides a large mutilated image of Surya, installed in the *garbha-griha,* there are a number of broken figures of other divinities. On the architectural and sculp tural grounds this temple may be assigned to the last quarter of the eighth century AD.

90. CHANDELLA SCULPTURES, BHAGWANTPUR, DISTRICT JHANSI.—L. M. Wahal of the Northern Circle of the Survey noticed sculptures of the Chandella period, representing Ganesa, Karttikeya, Hara-Gauri and Dikpalas in the village Bhagwantpur.

91. INSCRIBED BRICKS, ERACH, DISTRICT JHANSI.—L. M. Wahal of the Northern Circle of the Survey noticed two bricks measuring 26.67 X 26.67 X 10.16 cm, bearing each a single-lined inscription in Brahmi characters of the first century BC. The inscription reads: (i) as *Bhaga- ------ Saparakisa;* and (ii) *Siddham Bambikisa Damamitasa pari(ri)kasa.*

92. MEDIEVAL SCULPTURES, AMRODHA, DISTRICT KANPUR DEHAT.—L. M. Wahal of the Northern Circle of the Survey discovered stone sculptures belonging to the Brahmanical pantheon representing Uma-Mahesvara, Ganesa, Mahisasuramardini and Ekamukha *Siva-linga* assignable to the medieval period.

93. EARLY HISTORICAL SITE, CHANWAR, DISTRICT KANPUR DEHAT.—L. M. Wahal of the Northern Circle of the Survey discovered grey ware, Northern Black Polished Ware and black-slipped ware, besides red ware of the Sunga-Kushana period and bricks measuring 55 X 57 X 7 cm and 50 X 26 X 7 cm at Chanwar.

94. MEDIEVAL SCULPTURES, KUMBHI, DISTRICT KANPUR DEHAT.—L. M. Wahal of the Northern Circle of the Survey discovered medieval sculptures representing Ganesa, Devi and Marichi at the village.

95. EARLY HISTORICAL SITE, NARIHA, DISTRICT KANPUR DEHAT.—L. M. Wahal of the Northern Circle of the Survey discovered Northern Black Polished Ware, red-slipped ware and red wares, Sunga-sized Mauryan bricks and a few terracottas assignable to the Sunga-Kushana period. He also discovered medieval .stone sculptures representing Surya, Vishnu, Parvati, *vidyadharas* and some architectural members at the village.

96. EARLY HISTORICAL SITE AND MEDIEVAL SCULPTURES, RIHINIYAPUR, DISTRICT KANPUR DEHAT.—L. M. Wahal and Narayan Vyas of the Northern Circle of the Survey noticed a mound, known as Khareswara or Kanshasan, near the village. The site yielded Northern Black Polished Ware and black-polished ware of early historical period, besides red ware of medieval period. L. M. Wahal also discovered a number of sculptures and architectural fragments repre senting Surya, Mahisasuramardini and an unidentified female deity, lion etc. in the vicinity of the same village.

97. MEDIEVAL SCULPTURES, NARWAL, DISTRICT KANPUR SAHAR.—L. M. Wahal of the Northern Circle of the Survey noticed medieval sculptures representing Vishnu, Varaha, Siva and Parvati, besides fragmentary architectural members assignable to the medieval period.

98. MEDIEVAL SITE, RAMAIPUR, DISTRICT KANPUR SAHAR.—L. M. Wahal of the Northern Circle of the Survey reported the discovery of medieval pottery from a mound situated in the village Ramaipur.

99. EARLY HISTORICAL AND MEDIEVAL SITE, KHUMEHRI, DISTRICT MAINPURI.—L. M. Wahal of the Northern Circle of the Survey discovered N.B.P. Ware, black-polished ware, red ware of the medieval period and terracottas of the Sunga-Kushana period, besides stone sculptures of Ganesa, Siva and Parvati.

100. EARLY HISTORICAL AND MEDIEVAL SITE, NAGLA DEYAL, DISTRICT MAINPURI.—L. M. Wahal of the Northern Circle of the Survey discovered N.B.P. Ware, black-slipped ware and red ware of the medieval period at the site.

101. P. G. WARE, SUNGA-KUSHANA AND MEDIEVAL POTTERY, NAGLA KHERA, DISTRICT MAINPURI.—L. M. Wahal of the Northern Circle of the Survey noticed Painted Grey Ware, black-slipped ware and red ware of the Sunga-Kushana and medieval periods from a mound in the village.

102. EARLY HISTORICAL AND MEDIEVAL SITE, NINOLI, DISTRICT MAINPURI.—L. M. Wahal of the Northern Circle of the Survey, picked up sherds of fine grey ware, black-slipped ware and red ware of the medieval period, besides Sunga terracottas.

103. EARLY HISTORICAL AND MEDIEVAL SITE, SAHAN, DISTRICT MAINPURI.—L. M. Wahal of the Northern Circle of the Survey discovered N.B.P. Ware, black-slipped ware and red ware of the Sunga-Kushana, Gupta and medieval periods, besides Sunga-Kushana and Gupta terra cottas.

104. OCHRE-COLOURED POTTERY, SAKET COLONY, MEERUT, DISTRICT MEERUT.—C. P. Singh of Northern Circle of the Survey recovered sherds of Ochre-Coloured Ware from a pit at the depth of 1.5 m sunk for the installation of a pumping set in the Saket colony within the town limits of Meerut.

105. GUPTA ARCHITECTURAL PIECES, SULTANPUR, DISTRICT MIRZAPUR.—Sunil Kumar of the Mid-eastern Circle of the Survey discovered a large number of architectural pieces belonging to the Gupta period.

106. MEDIEVAL SCULPTURES, BANGARMAU, DISTRICT UNNAO.—Narayan Vyas of Northern Circle of the Survey discovered a number of medieval sculptures and architectural fragments scattered around the village. Noteworthy among them are of Ganesa and a door-jamb of a temple depicting the river goddesses.

107. MEDIEVAL SCULPTURES, UTTAR KASHI, DISTRICT UTTAR KASHI.—L. M Wahal of the Northern Circle of Survey noticed stone sculptures of Vishnu and Uma-Mahesvara assignable to *circa* tenth century AD at Uttar Kashi.

108. METALLIC MASK OF PARVATI, MAHIDANDA, DISTRICT UTTAR KASHI.—L. M. Wahal of the Northern Circle of the Survey and Sakalani of Garhwal University, noticed at Mahidanda a metallic mask of the goddess Parvati assignable to seventeenth-eighteenth century AD.

V. RADIOCARBON DATES

Radiocarbon dates[1] presented below were determined at the Birbal Sahni Institute of Palaeobotany, Lucknow. The dates are based on radiocarbon half life value of 5730±40 years; for their conversion into BC scale the year 1950 is to be taken as the base.

JAMMU AND KASHMIR

GUFKRAL, DISTRICT PULWAMA

BS-356, Neolithic level; Period IB; wood charcoal; depth 1-65 m; sample no. GFK/2/81	3570±110 BP
BS-357, Neolithic level; Period IB; wood charcoal; depth 1-70 m; sample no. GFK/3/81	3470±110 BP
BS-358, Aceramic Neolithic level; Period IA; wood charcoal; depth 1-80 m; sample no. GFK/4/81	3130±110BP
BS-359, Neolithic level; Period IB; wood charcoal; depth 1-65im; sample no. GFK/7/81	3980±120 BP
BS-360, Neolithic level; Period IC; wood charcoal; depth 1-35 m; sample no. GFK/5/81	3340±100 BP
BS-370, Neolithic level; Period IC; wood charcoal; depth 1-50 m; sample no. GFK/6/81	2790±110BP
BS-371, Neolithic level; Period IC; wood charcoal; depth **1.5** m; sample no. GFK/1/81	3570±100BP

[1]Determination was done by G. Rajgopalan, while the samples were submitted by the Archaeological Survey of India.

VI. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS[1]

The present report incorporates the work done on the subject at the Birbal Sahni Institute of Palaeobotany, Department of Botany of the Gujarat University, and the Botany Department of Jammu and Kashmir State.

It must particularly be mentioned that the cumulative distinguishing criteria in the husks of the wild and cultivated strains of rice have emerged from the morphological studies, statistical analysis, including calculation of Mode and Averages and the Scan Electron Microphotography of husks of several authentic specimens of the wild and cultivated strains of *Oryza* as carried out at the Birbal Sahni Institute of Palaeobotany. These are being utilized in identifying and referring to the rice remains of the cultivated and wild strains of *Oryza*. The Scan microscopy of the husks of the carbonized grains and those on the imprints in potsherds will be taken up soon.

From the absence in India of *Eleusine coracana* sub sp. *africana* the immediate progenitor of Ragi, the domestication of Ragi, *E. coracana,* has been believed to have occurred in Africa. A search made of plants of *E. coracana-indica-africana* complex in the country by the Birbal Sahni Institute has been rewarded by the discovery of plants of this progenitor, the identity of which has also been established through the scanning electron microphotography of the seeds of *Eleusine-coracana-indica-africana* complex. Further the data arranged in metroglyph graph has revealed that this *E. coracana* sub sp. *africana* from India and Africa belong to a common group and should be ranked as a separate species. This discovery from the country opens up once again the question whether Ragi was domesticated in India or Africa. The Archaeological records of Ragi from India are much older than those of Africa.

JAMMU AND KASHMIR

1. GUFKRAL, DISTRICT PULWAMA.—Seven charcoals samples ranging from aceramic Neolithic to historical period were processed, sectioned and permanent mounts prepared. The charcoal from the historical and mature Neolithic periods were identified as *of Pinus* and *Picea* species, and from Neolithic with pottery period, charcoals of *Ulmus* and *Pinus* have been identified.

MADHYA PRADESH

2. DANGWADA, DISTRICT UJJAIN.—In all thirteen samples of carbonized seeds ranging in age from the Chalcolithic to the early historical period were studied. Food grains identified from the samples from Chalcolithic (Malwa and Ahar) period are of *Oryza rufipogon, Oryza sativa, Triticum aestivum, Vigna mungo, Vigna radiatus, Lens esculentus* and *Zjzyphus* sp.

The seeds identified from the early historical (the Sunga and Gupta periods) are of *Triticum aestivum, Triticum compactum, Oryza sativa, Oryza rufipogon, Lens esculentus, Lathyrus sativus* and *Zizyphus* sp.

3. RUNIJA, DISTRICT UJJAIN.—The grains of *Triticum aestivum* and *Triticum compactum* were identified from the Sunga period only.

[1]Contributed by Vishnu-Mittre, Aruna Sharma and Chanchala.

MAHARASHTRA

4. DAIMABAD, DISTRICT AHMEDNAGAR.—The carbonized seeds of Ragi, *Eleusine coracana* from Malwa and Jorwe cultures have been found to show variability in size. To understand significance of this variability in the carbonized seeds, the studies of modern seeds of Ragi were undertaken. The variables in modern seeds were categorized. More or less similar categories of variable seeds have been recognized in the carbonized grains also. Further work is in progress. 5 samples of charcoal ranging from the Savalda to the Jorwe cultures were examined. Charcoals from a depth of 10 m are identified as of *Dalbergia* sp. and from depths 4-10x2-10 m as *of Acacia* sp.

PUNJAB

5. SINGH-BHAGWANTPUR, DISTRICT RUPNAGAR.—Carbonized grains of *Triticum aestivum* and *Triticum compactum* were identified from the sample numbers 30-T-26 X XV-XX (4) of Period III (*c.* 1100-1800 AD) from this historical site. Well-preserved fibres of cotton *(Gossypium)* were identified in the samples 30-R-96, IX-40-86-1-90, V-XX1, 90-1, 90.

UTTAR PRADESH

6. MAHAGARA, BELAN VALLEY, DISTRICT ALLAHABAD.—The rice husk impressions were found in varying proportions in all the eight samples (seventy-four potsherds examined). The slender imprints with a chess-board pattern having few horizontal wavy rows and big circular granules with less spacing between them have been referred to the perennial wild rice *(Oryza rufipogon)* and the broad slender among them with distinctive characters to the cultivated *0. sativa.* A wild grass fruit has been identified as of *Ischaemum rugosum,* a weed which grows in the paddy fields.

7. LAHURA-DEVA, DISTRICT BASTI.—Out of three samples only two potsherds bear re mains. Only wild annual and perennial strains *(0. nivara, 0. rufipogon)* have been identified.

8. SOHGAURA, DISTRICT GORAKHPUR.—*0. nivara, 0. rufipogon,* and *0. sativa* were identified.

9. BARAUNHA, ADVA VALLEY, DISTRICT MIRZAPUR.—Out of twenty-three potsherds examined two samples are from this Neolithic site. The rice imprints have been discovered in only four (1-2 per potsherd). Two strains of the wild annual *(0. nivara)* and wild perennial *(0. rufipogon)* have been identified.

10. MANIGARA, ADVA VALLEY, DISTRICT MIRZAPUR.—Out of eleven samples examined from this Neolithic site the rice husk remains in only four of them have been referred to as the wild perennial *(0. rufipogon),* the wild annual *(0. nivara)* and the cultivated *(0. sativa).*

11. MAGHA, ADVA VALLEY, DISTRICT MIRZAPUR.—Imprints of wild perennial and cultivated strains of *Oryza rufipogon* and *0. sativa* were identified in the five samples examined from this Chalcolithic site. Imprints of Kodon *(Paspalum scrobiculatum),* two well-preserved grains of Sawan *(Echinochloa crus-qalli)* and imprints of fruits of *Ischaemum rugosum,* a wild grass in paddy fields have also been identified from the burnt clay lumps. However, the impressions of grass leaf and stem in the burnt clay could not be identified.

12. KAKORIA, DISTRICT VARANASI.—Out of six samples, only five were found rich in rice husk remains, among which the wild perennial *Oryza rufipogon* and the cultivated *0. sativa* have been identified.

VII. MUSEUMS

1. GOVERNMENT MUSEUM, AJMER.—Steps were taken to prepare museum catalogue.

2. GOVERNMENT MUSEUM, ALMORA.—Apart from ninety-eight coins, forty-nine antiquities including sculptures, terracottas, paintings, sealings, illustrated manuscripts, textiles, bronzes and copper-plates were added to the Museum collection during the period under review. Among the antiquities, the following deserve special mention: a steatite disc-fragment of about second century BG from Moradhaj containing on one side a fort-complex with a tank, a temple, a *vatika* and a gateway and on the other the fore-part of a horse; an exquisitely-carved statue of Parvati of the ninth century AD (pl. XXXII A); Seshasayi Vishnu (pl. XXXII B) with an inscription of SE 1136 from Dwarahat; bust of Mahishamardini from Daulaghat; a fragmentary inscribed statuette of Ganesa of the Katyuri art-style from Rupkund; a beautiful image of Vishnu of the ninth century AD; and a headless image of a Jina of the ninth century AD from Bamansuyal. The hoard of thirteen Almora coins from the Garuda region introduces to us a new ruler Gomitra, whose name is clearly written on the obverse in Brahmi characters of *circa* second century BG. Mention may also be made of a gold coin of the Kushana king Vasudeva showing the three-faced figure of Siva on the reverse and a manuscript of *Panchtirthi Gita* containing twenty-one paintings of the late Garhwal school.

3. ARCHAEOLOGICAL MUSEUM, BODH GAYA.—The original railing-pillars from the Mahabodhi temple have been displayed in the open courtyard of the Museum.

4. PRINCE OF WALES MUSEUM OF WESTERN INDIA, BOMBAY.—In paying tribute to Chhatrapati Shivaji on his 301st Death Anniversary a special display of Maratha exhibits was arranged in the Key Gallery. Twelve terracottas of the Sunga, Kushana and Gupta periods and sixty-four beads and other objects were acquired. Two outstanding sculptures (pl. XXXIII A and B), one each of Siva and Skandamata stylistically belonging to the middle of sixth century AD from a local temple were donated to the Museum by the owner Kesharbai S. Paralkar. A stone plaque depicting Lajja-Gauri found on the Gharapuri island was presented to the Museum.

5. ASUTOSH MUSEUM OF INDIAN ART, CALCUTTA.—The Museum added to its collection a number of punch-marked and tribal coins of India. The Museum also acquired a few items of bronze sculptures, most of which belong to the late medieval period. One outstanding bronze statuette representing a dancing deity of tribal origin is ascribable to the early historical period. Other important acquisitions of the Museum included two illustrated leaves of a *Prajnaparamita* manuscript of the twelfth century AD from Nepal and a nineteenth century illustrated palm leaf manuscript from Orissa (pl. XXXIV A).

6. BHURI SINGH MUSEUM, CHAMBA.—The Museum acquired fifty-four objects during the year under review. These consist of stone sculptures and carvings, terracottas, bronzes, miniature paintings and drawings, manuscripts, an inscribed copper-plate of the seventeenth century from Chamba and objects of decorative arts, cultural anthropology and other minor arts.

7. CHANDRADHARI MUSEUM, DARBHANGA.—The Museum acquired a painted manuscript of the *Kamasutra* of the Mithila School, line-paintings on the Ramayana, old decorated costumes of Mithila etc.

8. ARCHAEOLOGICAL MUSEUM, RED FORT, DELHI.—The Museum received forty-two coins and one hundred and forty-two glass objects from the Bombay Customs.

9. GAYA MUSEUM, GAYA.—The Museum acquired thirteen Buddhist and Brahmanical stone sculptures ranging in date from the sixth to the ninth century AD from Gaya city. The images include nativity of Buddha, Buddha, Tara, Surya and Uma-Mahesvara.

10. ARCHAEOLOGICAL MUSEUM, HALEBID.—The Museum acquired one gold coin of Vira Ballala II of the Hoysala dynasty and fifty soapstone sculptures.

11. ARCHAEOLOGICAL MUSEUM, HAMPI.—The Museum acquired two hundred and eighteen gold coins, a beautiful image of seated Lakshmi and a few Stone Age tools found near Hampi.

12. GOVERNMENT MUSEUM, JAIPUR.—Three stone sculptures were collected from Additional District Magistrate, Jaipur City. Some exhibits from the reserve collection were displayed in the Gallery.

13. GOVERNMENT MUSEUM, JODHPUR.—Six hundred and eighty-six coins were chemically treated and preserved. Eight antiquities including an inscribed memorial pilar, sculptures and terracotta figurines ranging in date from the ninth to twelfth century AD were acquired. The important inscribed memorial (ninth century AD) from Osian and a few inscribed copper-plates were displayed in the Museum.

14. GOVERNMENT MUSEUM, KOTA.—Four antiquities were acquired. The most important among these is an image of Ganesa with his consort, found at Baran.

15. STATE MUSEUM, LUCKNOW.—During the period under review sixty-one objects including six sculptures, seven terracottas (pl. XXXIV B), six coins, twelve copper celts and two harpoons were acquired.

16. FORT ST. GEORGE MUSEUM, MADRAS.—"Prints on Madras" displaying aqua-prints drawn by English artists of the eighteenth-nineteenth century have been displayed in the new gallery. The bust of Marinna, the symbol of French Republic, and maps showing Indo-French territories also have been displayed in the Indo-French Gallery. Besides, sixteen confiscated antiquities have been acquired.

17. GOVERNMENT MUSEUM, MADRAS.—The Museum acquired seven stone sculptures (pl. XXXII C) sixty-three metal antiquities including images, fifteen bronzes and a set of copper-plate grant in five leaves fastened with a ring. The Museum also purchased one welded-copper oxidized sculpture and many paintings. Besides, thirty-six miscellaneous objects including a set of copperplates of Venkatapati I of Aravidu dynasty were received as gifts.

18. GOVERNMENT MUSEUM, MATHURA.—During the year under review two hundred and twenty-six antiquities, consisting of thirteen stone sculptures, seven terracottas, one hundred and ninety-three coins, three paintings and ten stamps were acquired, some as gifts and others purchased. Of considerable interest amongst these are *Eka-mukha Siva-linga* and a headless sculpture of Indra (pl. XXXIV C). One of the coins is an issue of Jahangir, depicting a lion. A new coin gallery has been opened, where the coins have been displayed in a chronological sequence.

19. ARCHAEOLOGICAL MUSEUM, NAGARJUNAKONDA.—A chain railing has been provided around the standing image of Buddha in Gallery I. Two earthen granary jars have been displayed within two glass show cases in Gallery V.

20. CENTRAL MUSEUM, NAGPUR.—The Museum received from the Deccan College, Pune, about thirty antiquities found in the earlier excavations at the Megalithic sites at Borgaon and Naikund, District Nagpur.

21. STATE MUSEUM, PANAJI.—The Museum acquired a broken Jaina sculpture from the ruins of Jaina settlement of the Bandivade village (Taluka Ponda), a broken wooden sculpture of the goddess Satari discovered in the Chandor village (Taluk Sasashti), blocks and moulds of Portugese currency-notes and two-hundred and seventy-two sculptures and other art objects by explorations and gifts from the institutions and public. The Museum opened a gallery of kite and costumes which were used in the traditional folk drama of *Dasavatara.*

22. PATNA MUSEUM, PATNA.—Forty-three stone antiquities were presented to the Museum. Notable amongst them are: an architectural piece having lotus with snake-like petals, an architectural piece with Gajalakshmi, and images of four-armed standing Parvati, Uma-Mahesvara, Vishnu, Surya, Sarasvati, Avalokitesvara, Tara and Buddha in various *mudras.* The Museum also received a bronze image of Tara, ninety-five coins and an inscribed terracotta plaque depicting Avalokitesvara.

23. HIMACHAL STATE MUSEUM, SIMLA.—During the period under review the Museum acquired three hundred and eighty-seven objects. They include Indian miniature paintings, drawings, stone and metal sculptures, terracottas, fifty ancient coins, Persian documents, manuscripts besides wood carvings from a collapsed eighteenth-century temple at the Shari (Matyana) village in District Simla.

24. TIPU SULTAN MUSEUM, SRIRANGAPATNA.—The Museum has acquired one dagger, six eighteenth-century swords and two large cannons from a field opposite the fort-wall of Srirangapatna.

25. ARCHAEOLOGICAL MUSEUM, VELHA GOA.—A few portraits (paintings) have been exhibited.

VIII. ARCHITECTURAL SURVEY

TEMPLE SURVEY, NORTHERN REGION.—The Temple Survey Project, Northern Region of the Survey, under R. D. Trivedi, carried on the survey of the temples in the districts of Chamba, Kangra, Mandi and Kulu in Himachal Pradesh. The notable temples are briefly described here.

A re-assessment of the rock-cut shrines of Masrur (pl. XXXV A) in District Kangra disclosed that these rock-cut temples are comparable in their mode of carving and certain architectural details with the rock-cut Chaturbhuja temple in Gwalior fort and the Dharmanatha temple at Dhamnar in District Mandsaur.

A small temple, situated about 1 km west of the Baijnath town in District Kangra, is *triratha* on plan and consists of a *garbha-griha* and *antarala* (pl. XXXV B). Its low *adhishthana* with boldly-carved *kalasa* and *kapotika* mouldings is surmounted by the *jangha* having a *bhadra*-niche under a *khura-chhadya* on each side. The *bhadra-niche* is flanked by pilasters of stonework decorated with *ghata-pallavas* and floral patterns. Similar pilasters also decorate the *karna* portions of the *jangha.* Outer surface of the *sikhara* is mostly damaged leaving only back *karnas* showing compressed *amalakas* which divide the *sikhara* in seven *bhumis.* The *amalaka* at the top is conspic-ously small. The doorway with plain door-jambs is flanked by the figure of the river-goddesses on the lower side and bears at the *lalata-bimba* a pilastered niche containing the image of Lakulisa. Stylistically, the temple can be dated to the tenth century AD.

There is a small Siva temple which is remarkable for its early features (pl. XXXVI A) at Mandi, beside the Trilokanatha temple on the bank of river Beas. Resting on a platform it consists of a *garbha-griha* and an *antarala* inside the doorway. Its *adhishthana* has *khura, kumbha,* plain *antarapatra* and *kapotika* mouldings supporting *the jangha* portion relieved by *bhadra-niches* which are flanked by *ghata-pallava* pilasters. In two of the *bhadra-niches,* mutilated images of Surya and Ganesa are extant. Resting on a *kapotika* and a plain *antarapatra,* the *sikhara,* in three *bhumis* with *karna-amalakas,* is topped by an *amalaka.* The broad *madhya-lata* of the *sikhara* is decorated with prominent *chaitya-window* motifs and is strikingly similar to that of the central Indian temples of early medieval period. With its early architectural features the temple may be dated to the eighth century A.D.

Another small temple of the early medieval period has been noticed in front of the Siva temple at Nagar in District Kulu. The lower part of the temple is damaged, but the extant northern *bhadra-niche* carved with the image of Mahishasuramardini and *triratha sikhara* in three *bhumis* indicate its early character. The plain pilastered *bhadra-niche* surmounted by boldly-carved *udgama* is flanked by pilasters with *ghata-pallava* motifs. The *sikhara* resting over an *antarapatra* presents the *madhya-lata* decorated with *bhumi-amalakas* and is crowned by a succession of an *amalaka, kalasa* and a *vijapuraka.* This temple, like the Siva temple at Mandi, may be dated to the eighth century AD.

Bajaura and Jagatsukh are two other sites in District Kulu which have early medieval temples. The doorway of the Visvesvara Mahadeva temple at Bajaura is interesting. It faces the east. The *bhadra-shrines* containing the images of Ganesa, Vishnu and Mahishasuramardini on the three other cardinal sides are architecturally significant (pl. XXXVI B). Prominent pediments with central *bhadra-mukhas* surmounting the *bhadra-shrines* appear like *suka-nasikas* on all the sides over which rests the *sapta-ratha sikhara* in six *bhumis* topped with a huge *amalaka.* At Jagatsukh the Sandhyadevi temple and the Siva temple are assignable to the eighth-ninth century AD. The former resting on a platform has its *jangha* portion decorated with pillared windows and pilasters relieved with *ghata-pallava* motifs. The Siva temple at Jagatsukh, though

smaller in size, is a well-preserved example of the early temple architecture of the region. The *garbha-griha* of the temple rests on a moulded *adhishthana* preceded by a *mukha-mandapa* supported on two fluted pillars on the front side. The *jangha* portion carries *bhadra-niche* on three sides, containing Brahma in the north, Surya in the east and Vishnu in the south. The corners of the *jangha* are embellished with *ghata-pallava* pilasters over which an *antarapatra* carved with a band of half-lotuses and a plain *kapotika* support the *sikhara*. The *sikhara* in multiple horizontal tiers is carved with *chaitya-Window* motifs without *bhumi-amalakas* at the corners.

BUILDING SURVEY.—The Building Survey Project of the Survey took up the study of residential buildings of the medieval and later periods. W.H. Siddiqi, assisted by Inderjit Singh Sharma, M. M. Srivastava, C. P. Satsangi and J. B. Chand, surveyed and documented several domestic buildings in Delhi, Gujarat and Uttar Pradesh. Of these a few important specimens of domestic architecture are discussed below.

A fine example of medieval residential buildings on re-examination was found in a house complex called Mahal in south Delhi amidst the ruins of Jahanpanah (city founded by Muhammad bin Tughluq in the second quarter of the fourteenth century). It is located close to Bijai Mandal, a royal Tughluq palace, and can be attributed to the fourteenth century on stylistic ground. Built of rubble and lime, Mahal consists of a central courtyard surrounded by an arcade with typically wide-pointed arches of the Tughluq variety and an entrance on the south-east corner with a staircase leading to roof. The house on the west has three compartments topped by pyramidal roofs joined through a vault. To the west of the courtyard is another compartment projecting outside and consisting of fourteen bays. The upper storey of the building, confined to the north-east corner, comprises two compartments, of which the principal one opens to the east and has a plastered dome ornamented with incised designs. A winding staircase in the thickness of the south wall gives access to the roof of the upper floor with walls containing red sandstone brackets on the north-south and east perhaps to support projecting balconies. Five graves of unknown persons within an enclosure in the courtyard belong probably to later periods. A portion of the enclosure retains some traces of glazed-tile ornamentation.

Among the significant buildings surveyed in Gujarat mention may be made of *havelis* (large houses) of Harilal Gandhi at Ahmadabad, Suresho Desai at Vadodara and Vithal Bhai Amin Bhai Patel at. Vaso in District Khaira.

Harilal Gandhi's *haveli* of Ahmadabad is notable for its elaborately-carved main entrance with floral and geometrical designs. The profusely-decorated lintel of the door bears the figure of Krishna playing on flute and surrounded by cows, musicians, birds in a grove, besides *guldasta* motif in the centre.

The *haveli* of Suresho Desai at Vadodara (pl. XXXVII) is a three-storeyed structure, built of *lakhauri* bricks and lime. Its main entrance is flanked by two windows. The *haveli* has been provided with a narrow varandah supported on wooden pillars, carved with various floral designs. A charming feature of the building is represented by its cornice decorated with friezes of elephant-heads.

The *haveli* of Vithal Bhai at Vaso (District Khaira) is a palatial edifice of four storeys raised on a platform (fig. 10) rectangular on plan. The whole structure is composed of wooden pillars and beams, the gaps being filled in with fine brick masonry and finished with lime plaster. The richness of wooden ornamentation is conspicuous on its main (street side) facade, principal door, pillars and balconies (pl. XXXVIII A). Its main entrance is embellished with carvings including a figure of Ganesa in the middle of the lintel. The *haveli* has a central courtyard surrounded by a pillared varandah, with an underground tank for the storage of rain water. The ground storey of the main building contains thirteen rooms of different sizes besides two large vestibules. The wooden pillars of its interior have stone-bases and finely-carved

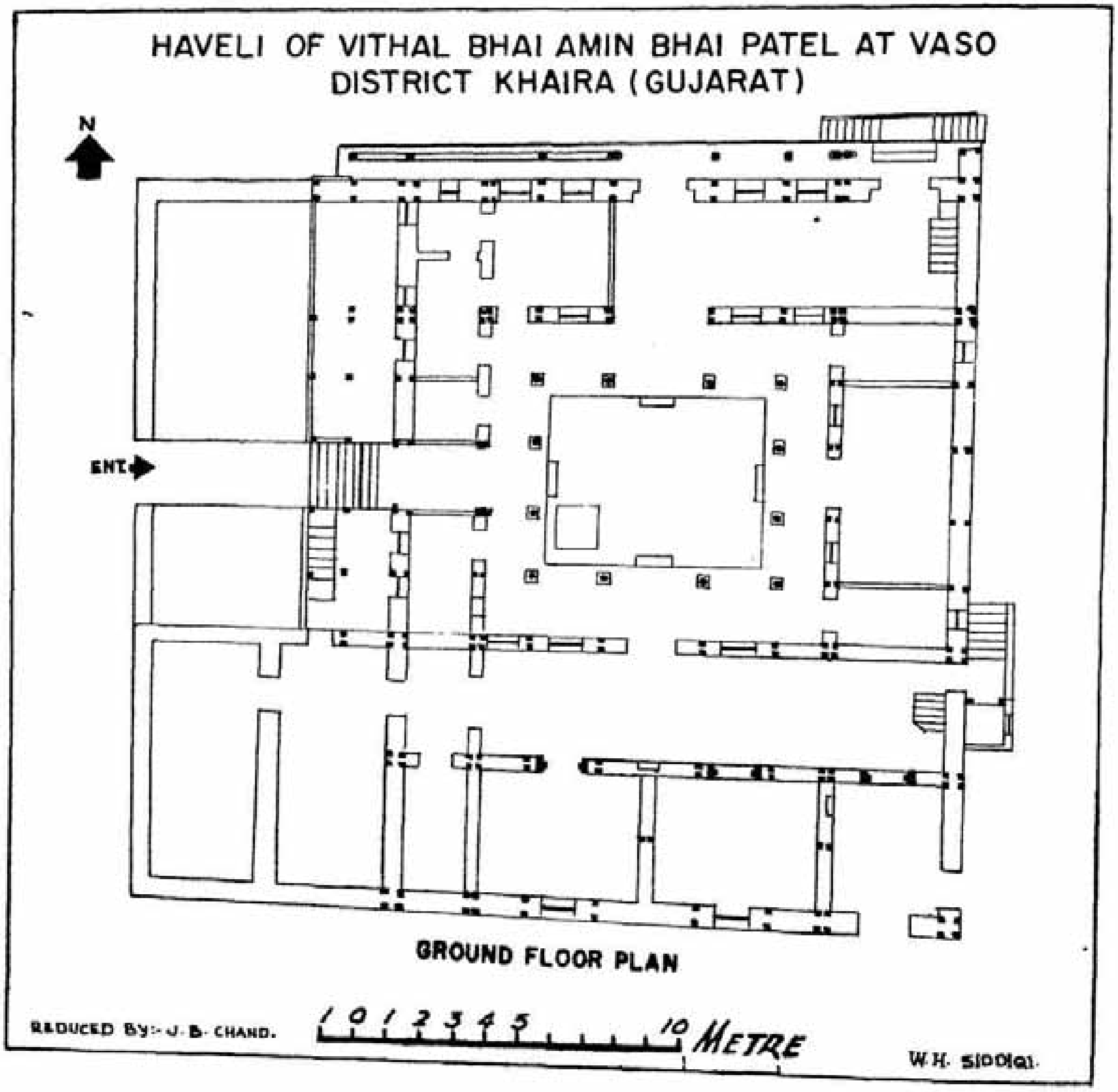

HAVELI OF VITHAL BHAI AMIN BHAI PATEL AT VASO
DISTRICT KHAIRA (GUJARAT)
N
ENT.
GROUND FLOOR PLAN
REDUCED BY:- J. B. CHAND.
1 0 1 2 3 4 5 10 METRE
W.H. SIDDIQI.

FIG. 10

capitals with wooden brackets bearing floral and geometrical designs. The latticed windows of this floor has ornate frames with carvings and paintings, depicting figures of Krishna, Vishnu and other divinities. The principal attraction of the first floor is the main hall with its beautifully-decorated ceiling (pl. XXXVIII B). Some of the rooms in this part have also false wooden ceilings bearing floral, geometric and other designs. The hall of the second floor is also profusely embellished, specially interesting is the ceiling ornamented with floral carvings having inlaid ivory. The projecting balconies on the first and second storeys are supported on wooden struts and brackets in animal-forms. The top floor, which is open on three sides excepting the south, contains rooms, with a well-decorated frontal hall which has beautifully-carved cusped arches, brackets and rings to be used for a swing. The building is a good specimen of the late eighteenth century civic architecture of Gujarat.

Of the buildings surveyed in Uttar Pradesh the noteworthy ones are the *havelis* of Guru Ram Rai at Dehra Dun and of J. P. Sharma at Raipur near Dehra Dun, and Karbali Nawab-ki-haveli at Lucknow, Bara Mahal or Qawi Kamal Khan-ki-haveli at Malihabad (District Lucknow) and Baramal-ki-haveli at Kankhal (District Saharanpur).

The *haveli* of Guru Ram Rai is of the period of Aurangzeb as evidenced from a Persian inscription mentioning the name of the emperor. A double-storeyed building with a lofty entrance gate, it has a hall in each floor with pillars of late Mughal types. The ground floor has a flat ceiling, while the upper one is covered with a vaulted roof. Potraits of different Sikh Gurus, their followers, musicians and important Mughal personages are painted within this edifice. The main entrance surmounted by a fluted vault contains profuse ornamentation including fine paintings depicting Brahmanical divinities and scenes from Brahmanical mythology.

The *haveli* of Bhagwan Singh at Timli is built *of lakhauri* bricks and lime. Its main gateway consists of a multi-foiled arch, of which the spandrels are ornamented with stars in relief. Both sides of the gate have recessed arches at lower level, while the upper portion bears human figures in relief. The second storey is provided with small projecting balconies, supported on stone brackets on both the sides. The wooden door-frames are decorated with floral and geometrical designs.

The *haveli* of J. P. Sharma at Raipur is a double-storeyed house having a lofty arched-entrance and projecting shade with a curvature. On either side of the gate are niches bearing paintings of Brahmanical deities, musicians, horse-riders, royal couples etc. The spandrels of the main gate have been richly ornamented with floral and geometrical designs.

Of *lakhauri* bricks set in lime mortar, Karbali Nawab-ki-haveli at Chowk, Lucknow, was originally a large mansion of three storeys. Its eastern and northern walls are still extant. The ruined part of the structure contains portions of walls of the interior with niches and *darichas.* The south-western portion of this structure was built on a raised platform and contains a pillared hall *(Diwan-khana),* side rooms of various sizes and tower-like staircase. This building has a rectangular plan, common to the *havelis* of *Awadh* style, with arched cloisters on its three sides, attached rooms and a *deorhi* (porch).

Bara Mahal or the *haveli* of Nawab Qawi Kamal Khan at Malihabad, said to have been built by Faqir Muhammad Khan about two hundred years back, can be considered to be a true representative of the domestic architecture of Awadh. Built on a rectangular plan, this *haveli* is a double-storeyed building in *lakhauri* bricks and lime. It has plaster-ornamentation with colours. Its *deorhi* (porch) opens into a large courtyard with arched verandah and rooms. The brick pillars have flutings in plaster and deep cusped arches (nine in numbers) following Awadh style. The flat ceiling is supported on long square wooden beams and rafters. Its *Diwan-khana* is built on a raised platform with double-storeyed galleries, rectangular *darichas* and balconies.

The remains of the *haveli* of Bharmal at Kankhal are now represented by its Inonumental gate of three storeys with multi-foiled arched entrance. Both the exterior and interior walls of the gateway bear panels painted with various Brahmanical deities, musicians, trees, creepers, flowers etc. Its lower portion is provided with recessed niches, while the upper part has projected balconies resting on stone pillars and carved wooden brackets. The top storey consists of arched openings and widows and battlemented elevation with solid miniature domes.

IX. PRESERVATION OF MONUMENTS

MONUMENTS OF NATIONAL IMPORTANCE

CENTRAL CIRCLE

Madhya Pradesh

1. DEVI JAGADAMBI TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—All portions of the *sikhara, mandapa* and *maha-mandapa* of the temple were made water-tight by sealing the joints and filling the hollows and cavities with toned mortar.

2. KANDARIYA-MAHADEVA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—The joints of the stones of the temple were sealed and made water-tight with toned lime-cement mortar and recess pointed.

3. LAKSHMANA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—All the joints were treated with recessed pointing and cavities and hollows filled up as measures-against percolation of rain water.

4. SIDDHESVARA TEMPLE, NEMAWAR, DISTRICT DEWAS.—In continuation of last year's work *{1980-81,* p. 124). the height of the compound-wall has been raised and all the openings closed for the security of sculptures.

5. ROCK-CUT CAVES, BAGH, DISTRICT DHAR.—In order to drain out the water accumulated on account of percolation, a network of drains were cut in Caves 4-7 in the rock floor and were connected with the main drain. The construction of R.C.C. pillars in place of damaged ones in Cave 2 has been taken up. After taking precautionary measures like erection of temporary brick pillars and piling of sand-bags to prevent the collapse of the roof the first phase of drilling and grouting operations before rock-bolting has been taken up on the roof. The machines required for the purpose were transported to the roof. G. 1. pipe-lines and centrifugal pumps were also installed on the roof for the supply of water from the river. Steps were also taken to prepare the exact plan of the caves to determine the affected zone for drilling and grouting. According to the consensus of various expert institutions, the drilling operation was planned initially along an alignment marked at about five metres beyond other extremities of the caves on the roof marking the bore holes at five metres intervals. The depth of drilling performed was about 22 metres from the top. This operation beyond the caves was undertaken mainly to provide a grouted curtain as a barrier to check the seepage of water from outer source. So far twenty-six bore holes have been drilled and ten completely sealed after grouting with cement slurry and reinforcing with M.S. rods. The total area of drilling successfully executed is about 585-55 square metre. The grouting operation is being done at the pressure of 2-5 per square cm. The material of the rock from different levels of each bore has been collected for permeability and percolation tests.

6. HATHI-POLE, MANDU, DISTRICT DHAR.—The big cavities in the walls of random rubble masonry were underpinned in *lime-surkhi* mortar and the walls were reconditioned.

7. JAMI MASJID, MANDU, DISTRICT DHAR.—In continuation of last year's work *(1980-81,* p. 125) the patches of dead plaster from the drum-surface of all the cupolas and domes of the mosque were raked off and fresh plaster was laid after filling the hollows and cavities (pl. XXXIX).

8. MAHADEVA TEMPLE, GANDAI, DISTRICT DURG.—The protected area of the temple was enclosed by constructing a coursed rubble masonry wall (1-50 m high) in lime-mortar with a barbed wire fencing over it.

9. JAMI-MASJID, ASIRGARH, DISTRICT EAST NIMAR.—After scooping out the loose and pulverised mortar from the roof of the mosque all the cracks and hollows were filled in with cement mortar and thereafter the surface was rendered water-tight by laying a layer of plaster *of kankar* lime, 20 to 25 cm in thickness.

10. BIBI-KI-MASJID, BURHANPUR, DISTRICT EAST NIMAR.—The dome was made water-tight after replacing the dead plaster by laying fresh lime-plaster.

11. TOMB OF ADIL SHAH, BURHANPUR, DISTRICT EAST NIMAR.—After removing the vegetation the damaged plaster was raked off and the surface of the dome was rendered water-tight by providing thick plaster in lime-mortar mixed with 1/8 cement and maintaining consistency in colour and texture.

12. TOMB OF NADIR SHAH, BURHANPUR, DISTRICT EAST NIMAR.—In continuation of last year's work *(1980-81,* p. 125), the items, involving replacement of old bulged-out, fractured and dislodged stones by new dressed cut-stones, in the facade of the tomb were completed.

13. GANESA GATE, GWALIOR FORT, DISTRICT GWALIOR.—The parts of the dislodged and out-of-plumb portion of the gate and the supporting components are being refixed on their original pattern.

14. GUARD-ROOM IN MAN MANDIR PALACE, GWALIOR, DISTRICT GWALIOR.—The work of resetting the bulged-out and damaged portions of the wall with masonry in lime-mortar is in progress.

15. TAPSI MATH, BILHARI, DISTRICT JABALPUR.—The covered steps of the temple have been exposed and reconditioned to arrest percolation of rain-water through the surface. Fresh lime-plaster was laid after removing the decayed one.

16. VISHNU-VARAHA TEMPLE, BILHARI, DISTRICT JABALPUR.—A high barbed-wire fencing was provided for the security of the sculptures.

17. SHAH BURJ, MANDLA, DISTRICT MANDLA.—The thick vegetation has been removed.

18. NAV-TORANA TEMPLE, KHER, DISTRICT MANDSAUR.—The work of replacement of various cracked and dislodged components of the temple by new ones on the original pattern is in progress.

19. GADHI, PADHAVALI, DISTRICT MORENA.—In continuation of previous year's work *(1980-81,* p. 126), the work of exposing the remains of the medieval structure is in progress.

20. BADAL MAHAL, RAISEN, DISTRICT RAISEN.—The fallen debris has been, removed to trace the original foundation. After treating the voids and gaps, patches of the wall of random rubble masonry have been constructed in lime-mortar. The decayed roof-concrete of the dome was replaced by fresh lime-concrete.

21. STUPA 1, SANCHI, DISTRICT RAISEN.—The flagstone flooring of upper *pradaksina-patha* of the stupa has been completed by fixing full-length dressed stone slabs with fine joints matching the existing ones.

22. STUPA 3, SANCHI, DISTRICT RAISEN.—The cracks in stone casing of the drum were grouted. Cut-stone headers were also provided at required intervals to protect it from developing cracks. The entire drum has been made water-tight in toned mortar. The full-length dressed flagstone flooring has been provided on the upper *pradaksina-patha* of the stupa.

23. BUDDHIST MONASTERY, SONARI, DISTRICT RAISEN.—The bulged-out masonry wall has been taken out and reset in original alignment and the top surface made water-tight with lime-mortar.

24. MOSQUE INSIDE FORT, RAHATGARH, DISTRICT SAGAR.—The old and worn-out wooden beams were replaced by new ones. The relaying of stone slabs and concrete over the beams is in progress.

25. SIVA TEMPLE, BHUMARA, DISTRICT SATNA.—The sunken and decayed flooring inside and around the sanctum of the temple was removed and reconditioned with stone slabs over a bed of lime-concrete. The restoration work of cut-stone masonry in the superstructure was also completed.

26. KARAN TEMPLE, AMARKANTAK, DISTRICT SHAHDOL.—An apron of stone slabs over a subgrade of rammed boulders and *muram* has been laid around the temple. After providing adequate supports the cracked and displaced stones of the temple were removed; the work of resetting on the original pattern is in progress. The deep roots of the trees in the foundation of the stone slabs of the platform were removed and repairs to the flooring are in progress.

27. MONASTERY, CHANDREHI, DISTRICT SIDHI.—In continuation of last year's work *(1980-81,* -p. 127) the remaining item of providing cut-stone masonry in lime-cement mortar in the superstructure was completed and joints rendered water-tight.

28. CHAUBARA DERA NO. 1, UN, DISTRICT WEST NIMAR.—After removing the decayed and cracked concrete on the roof temple, the surface was relaid with fresh lime-concrete. The resetting of the fallen and dislodged stones of the wall (pl. XL) on eastern side was completed. The cracked stone lintel was also replaced.

DELHI CIRCLE

Delhi

29. BADLI-SARAI, DELHI.—The joints of brick and stone structures were pointed with lime-cement mortar.

30. DIWAN-I-AM, RED, FORT, DELHI.—The cavities in the rear portion of verandah facing Rang Mahal were grouted.

30. HAYAT BUX GARDEN, RED FORT, DELHI.—The bulged-out stones of the path and the platform around tank were reset in position.

32. HIRA-MAHAL, RED FORT, DELHI.—The loose marble stones of the parapet have been reset.

33. JAMI MASJID, DELHI.—Red sandstone *chhajja* was restored by fixing the stones with cement-mortar and copper dowel. Stones of the veneer and base stones were also replaced (pl. XLI).

34. LAHORI GATE, RED FORT, DELHI.—The red sandstone in southern bastions of Lahori Gate was cleaned and the motifs cured.

35. NAUBAT-KHANA, RED FORT, DELHI.—The decayed plaster was removed and the surface in the northern staircase replastered.

36. RED FORT, DELHI.—Bulged-out portion near Lahori Gate and fallen stones of the rampart were reset and restored with mortar and copper dowels. The inner cracks in the masonry were grouted. The dislodged red sandstone flooring was relaid.

37. SHAH-BURJ, RED FORT, DELHI.—The marble veneer stones of the parapet towards the east have been reset.

38. ZAFAR-MAHAL, RED FORT, DELHI.—The bulged-out stones in the north-west corner have been reset with cement mortar and copper clamps. A few *chhajja-slabs* were reset along with the wall of the adjoining staircase.

39. ADILABAD FORT, ADILABAD, NEW DELHI.—The random rubble stone masonry of the fortification-wall was repaired with lime, sand and cement mortar.

40. BARBAR'S TOMB, NEW DELHI.—The base of the grave was consolidated and the bulged-out portions were reset.

41. BARE-KHAN'S AND CHHOTE-KHAN'S TOMB, NEW DELHI.—Decayed plaster was removed and fresh plaster with lime-concrete mortar laid, fissures in the roof were filled, *chhatris,* lintels, pillar-base and pillars reset and wider cracks grouted with cement mortar. The decayed red sandstones of the *chhajja, jali* and *chhatri were* replaced with new ones in conformity with the original.

42. BEGUMPURI MOSQUE, NEW DELHI.—A wall of random stone masonry has been built and railing fixed.

43. BIJAY-MANDAL, NEW DELHI.—A wall of random rubble masonry was built and provided with railing.

44. GHIYASUDDIN BALBAN'S TOMB, NEW DELHI.—Random rubble stone masonry wall was built with *lime-surkki* mortar and joints pointed.

45. HUMAYUN'S TOMB, NEW DELHI.—The sandstone flooring was reset and a concrete drain was laid after cutting the old one. *Jalis* were also provided.

46. IDGAH, HAUZ-KHAS, NEW DELHI.—A compound-wall of random rubble masonry was constructed and railing provided over it.

47. MOHAMMADI MOSQUE, NEW DELHI.—Ornamental plastering has been done on the walls and the ceiling of the mosque. Rubble masonry work has been done in the compound-wall.

48. PURANA OILA, NEW DELHI.—Random rubble masonry in cement mortar was provided to fortification-wall. Cavities in the wall, terraces, ceiling and floors were grouted.

49. SAFDARJANG'S TOMB, NEW DELHI.—The raking and plastering was done along the western enclosure-wall.

50. SIRI FORT, NEW DELHI.—Buried portion of the fortification-wall has been exposed between the main gate at Shahpur Jat village and ASIAD village complex. Underpinning has been done in the overlying portion of the fortification-wall facing west.

51. TOFEWALA-GUMBAD, NEW DELHI.—Random rubble masonry pillars of the compound wall has been built, arches reproduced, concrete flooring laid, buried structures exposed and missing masonry of the wall constructed and water-tightened. The dead concrete masonry has been replaced with new ashlar masonry at the entrance of the tomb.

Rajasthan

52. KOTAN-KI-DEORI, TEMPLE COMPLEX, NEELKANTH, DISTRICT ALWAR.—The steps of the old temple were removed and the stones with decorative motifs reset, cavities grouted with lime-cement mortar and the flooring stone-slabs reset.

53. FORT-WALL, BHARATPUR, DISTRICT BHARATPUR.—The underpinning and pointing in the rubble stone masonry along the fortification-wall were done.

54. KESAV-BHAVAN, DIG, DISTRICT BHARATPUR.—The works of providing and fixing of missing stone railing and ornamental *jalis* were done.

55. NAND-BHAVAN, DIG, DISTRICT BHARATPUR.—The work of providing and fixing of the floor slabs have been done.

EASTERN CIRCLE

Nagaland

56. DIMAPUR RUINS, DIMAPUR.—Besides clearing the wild vegetation, the missing brick work was restored and roof terracing done.

Orissa

57. BARABATI FORT, CUTTACK, DISTRICT CUTTACK.—The voids and wide cracks on the walls of the fort were grouted and filled.

58. LINGARAJA TEMPLE COMPLEX, BHUBANESWAR, DISTRICT PURI.—While the pointing of joints in the walls of the main temple is being executed, grouting of cracks, sealing of open joints and resetting of bulged-out ornamental pieces with resin mortar were carried out in the Parvati temple (pl. XLII).

59. RAJARANI TEMPLE, BHUBANESWAR, DISTRICT PURI.—Resetting of dislocated stones and pointing of joints were done.

60. APSIDAL TEMPLE ON KHANDAGIRI, JAGMARA, DISTRICT PURI.—The missing masonry in the apsidal temple was restored. The displaced stone blocks of the floor and the walls have been reset in their original position.

61. SUN TEMPLE, KONARAK, DISTRICT PURI.—Stagnation of water around north and north-west corners of the temple was arrested by earth-cutting.

62. JAGANNATHA TEMPLE, PURI, DISTRICT PURI.—In continuation of previous year's work *(1980-81,* p. 129), the worn-out and damaged portions of the niche-shrine in the walls were consolidated by resetting and renewing stones. The weathered central columns of *mukti-mandapa* were reinforced by providing R.C.C. belt.

West Bengal

63. MADAN MOHAN TEMPLE, BISHNUPUR, DISTRICT BANKURA.—The brick-laid floors of the *bhoga-mandapa* was restored.

64. GROUP OF TEMPLES, NANNOR, DISTRICT BIRBHUM.—The cavities on the *sikharas* were filled up. The dead plaster from the roof was removed and the terrace relaid.

65. TOMB OF PIR BEHRAM SAKKA, BURDWAN, DISTRICT BURDWAN.—The compound-wall was repaired and a portion of the terrace around the tomb was relaid with *lime-surkhi* concrete.

66. BRINDABAN THAKUR'S MATHA, GUPTIPARA, DISTRICT HOOGHLY.—Structural repairs, grouting and sealing of cracks were carried out in the temples of Krishna-Chandra, Ramachandra and Nityananda.

67. TOWER OF NIMASARAI, MALDA, DISTRICT MALDA.—After uprooting plants the brick work in the basement was rebuilt and recess pointing of the tower done.

68. HAZAR-DUARI PALACE, MURSHIDABAD, DISTRICT MURSHIDABAD.—The worn-out wooden beams in some rooms of the palace were replaced with new ones.

69. KATRA MOSQUE, MURSHIDABAD, DISTRICT MURSHIDABAD.—The damaged arches in the western side of the mosque were repaired (pl. XLIII).

MID-EASTERN CIRCLE

Bihar

70. ANCIENT SITE, ANTICHAK, DISTRICT BHAGALPUR.—Brick-work in the robbed portion of the structural remains of southern shrine of the central sanctuary was done in *lime-surkhi*

mortar. The underground cell no. *2,* south of the main sanctuary, was also conserved in a similar manner. The work of providing barbed-wire fencing in the acquired area remained in progress. The earthwork was resumed in continuation of last year for the drain in the north-east of the monastery to make the ancient drain functional.

71. ROOK-SCULPTURES, PATHARGHATA, DISTRICT BHAGALPUR.—Cave 3 was provided with a flight of steps of stone masonry for easy access.

72. EXCAVATED REMAINS, NALANDA, DISTRICT NALANDA.—Underpinning, water-tightening and repairing of the structures with dressed bricks matching with the original were done in south-eastern tower of Temple 3 and a votive stupa on the south-east of Sarai mound.

73. MONUMENTS OF OLD RAJGIR, RAJGIR, DISTRICT NALANDA.—The randomrubble stone structural remains of Jivakaravana were reset in *lime-surkki* mortar and recess-pointed.

74. TOMB OF MALIK IBRAHIM BAYYU, BIHARSHARIF, DISTRICT PATNA.—The decayed plaster over the interior and exterior surface of the dome was removed carefully and *Mme-surkhi* plaster relaid. The breaches in the compound-wall were made good in brick-work laid in lime-*surkhi* mortar followed by a coping on the top.

75. EXCAVATED SITE OF THE MAURYAN PALACE, KUMRAHAR, DISTRICT PATNA.—Part of the pathway in the west, leading to the palace complex, was reconditioned with bricks on edge.

76. TOMBS OF SHAH MAKHDUM DAULAT MANERI AND IBRAHIM KHAN, MANER, DISTRICT PATNA.—The main tomb and the Namaz hall were provided with apron and the pathway leading to the main tomb was provided with bricks-on-edge.

77. SHER SHAH SURI'S TOMB, SASARAM, DISTRICT ROHTAS.—Decayed plaster on the exterior of the dome was replaced by a fresh one in *lime-surkhi* mortar mixed with accoproof. Fresh lime concrete was provided in place of the decayed one on a part of the terrace of the *baradari* in the east. The missing *chhajja-stones* were restored. The dislodged rear wall of the Idgah was reset and plastered. The walls of the mosque on the west of the gateway were replastered. Similar treatment was given to the mosque on the east. The decayed lime-concrete was dismantled from the causeway and provided with flagstone pavement laid in cement mortar over lime-concrete base. The dilapidated retaining wall (upper one) flanking the causeway was rebuilt after dismantling the leaning one.

78. JAMI MASJID, HADAF, DISTRICT SANTHAL PARGANA.—Decayed lime-concrete was removed from the prayer-hall and provided with fresh lime-concrete.

Uttar Pradesh

79. EXCAVATED REMAINS, KAUSAMBI, DISTRICT ALLAHABAD.—The upper three or four courses of the monastic remains around Asokan pillar, defence wall and Ghoshitarama monastery were removed carefully and reset in *lime-surkhi* mortar. Suitable drainage was also provided.

80. GARHWA FORT, SHANKARGARH, DISTRICT ALLAHABAD.—The dilapidated structural remains of the palace complex were reset in cement-lime mortar and tops rendered water-tight.

81. TOMB OF DAULAT IBRAHIM, MEHNAGAR, DISTRICT AZAMGARH.—The decayed concrete was dismantled and fresh concrete relaid.

82. RAJA MAN SINGH PALACE, KALINJAR FORT, DISTRICT BANDA.—Decayed lime-concrete was removed and fresh lime-concrete laid on the floor of some of the rooms.

83. EXCAVATED REMAINS, PIPRAHWA, DISTRICT BASTI.—The surroundings of the stupa were dressed up.

84. NIRVANA STUPA, KUSINAGARA, DISTRICT DEORIA.—In continuation of last year's work *(1980-81,* p. 151), the brickwork in the superstructure up to the ring-beam and the casting of the R.C.C. ring beam were completed.

85. IMAMBARA IN THE COMPOUND OF SHUJA-UD-DAULA'S TOMB, GULABBARI, DISTRICT FAIZABAD.—The decayed lime-plaster was removed and fresh plaster was laid over the walls, ceiling and pillars of Imambara.

MID-EASTERN CIRCLE

Karnataka

86. PARVATI AND KARTTIKEYA TEMPLES, SANDUR, DISTRICT BELLARY.—The work of replacement of rotten wooden lintels of the openings of the main *gopura* is in progress.

87. DURGA TEMPLE, AIHOLE, DISTRICT BIJAPUR.—Electrification has been done in the circumambulatory path of the temple to check the nuisance of bats.

88. TWO-STOREYED JAINA TEMPLE, AIHOLE, DISTRICT BIJAPUR.—Apart from providing approach-road to the cave, steps have been taken to prevent the effect of direct sunlight on the image by planting trees.

89. BHUTANATHA GROUP OF TEMPLES, BADAMI, DISTRICT BIJAPUR.—The dislodged stone apron was repaired and made functional.

90. GROUP OF TEMPLES ON THE NORTH SIDE OF THE LAKE TOWARDS THE EAST END, BADAMI, DISTRICT BIJAPUR.-—Damaged stone apron around the temples was removed and reset.

91. JAINA AND VAISHNAVA CAVES, BADAMI, DISTRICT BIJAPUR.—The dwarf wall in front of the caves was strengthened by pointing and grouting the wide joints.

92. ALI II ROUZA, BIJAPUR, DISTRICT BIJAPUR.—The old compound-wall was raised to protect the garden.

93. ASAR MAHAL, BIJAPUR, DISTRICT BIJAPUR.—The dilapidated masonry gateway of the southern side was dismantled and reconstructed but for the miniature minarets above the doorway.

94. SHAHPUR GATE, BIJAPUR, DISTRICT BIJAPUR.—The broken beam was strengthened by inserting concealed steel I-section girder in the beam covering the cavity in concrete. The terraced roof has been made water-tight.

95. VISVESVARA TEMPLE, HALLUR, DISTRICT BIJAPUR.—The works of scrapping the thick coats of lime-wash from the walls and pillars and grouting of cracks and cavities on the walls are in progress.

96. FORT AND TEMPLES, CHITRADURGA, DISTRICT CHITRADURGA.—After clearing the debris the work of reconstruction of fallen portion of the fort-wall and bastions is in progress.

97. KESAVA TEMPLE, BELUR, DISTRICT HASSAN.—The accretionary pillars supporting the broken beam in the cloister of the temple were removed after strengthening the beam by inserting concealed steel I-section girders.

98. HOYSALESVARA TEMPLE, HALEBID, DISTRICT HASSAN.—Pathways around the temple and garden were properly dressed.

99. PARSVANATHA BASTI, HALEBID, DISTRICT HASSAN.—Accretionary brickwork on the *padmapitha* and thick lime-wash of the *garbhagriha* were removed. Two Jaina sculptures covered with oil and dust were cleaned.

100. KALYANI (TANK), HULIKERE, DISTRICT HASSAN.—The resetting of the dislodged stones of the miniature shrines with niches on the eastern side is in progress.

101. AKKANA BASTI, SRAVANABELAGOLA, DISTRICT HASSAN.—The work of replacement of the broken beam of the *mukha-mandapa* is in progress.

102. CHAMUNDARAYA BASTI, SRAVANABELAGOLA, DISTRICT HASSAN.—The roof of the *mukha-mandapa* was made water-tight by providing flat tiles and necessary drainage. The wide cavities in the stone masonry walls were grouted and filled.

103. GOMATESVARA STATUE COMPLEX, SRAVANABELAGOLA, DISTRICT HASSAN.------The terraced roof is being made water-tight by providing flat tiles. Accretionary lime-wash on ornamental pillars and walls was removed. The broken roof-slabs of the room at the northeastern corner were replaced by new ones. The dislodged and sunken *mandapa* of the courtyard is being reset.

104. PARSVANATHA BASTI, SRAVANABELAGOLA, DISTRICT HASSAN.—The accretionary pillars of the *navaranga* were removed after strengthening the broken beam by concealed steel I-section girders.

105. RAMALINGESVARA TEMPLE, AVANI, DISTRICT KOLAR.—The work of reconstructing the fallen *prakara-wall* is in progress.

106. KOLARAMMA TEMPLE, KOLAR, DISTRICT KOLAR.—To prevent seepage of water into the foundation, flagstones were provided around the *mahadvara.*

107. SOMESVARA TEMPLE, KOLAR, DISTRICT KOLAR.—The missing pavement of the open courtyard has been restored.

108. GUMBAZ, SRIRANGAPATNA, DISTRICT MANDYA.—The damaged wall at the basement of Nagarkhana was reconstructed as per the original.

109. ARAKESVARA TEMPLE, HALE ALUR, DISTRICT MYSORE.—The sunken *mukha-mandapa* was restored after strengthening the foundation by laying a layer of concrete. The damaged concrete flooring was replaced by stone.

110. SRIKANTHESVARA TEMPLE, NANJANGUD, DISTRICT MYSORE.—The damaged stucco figures of the parapet on the *prakara-w&* were strengthened by grouting, filleting, filling cracks etc.

111. KESAVA TEMPLE, SOMANATHAPUR, DISTRICT MYSORE.—The *prakara-wall* was strengthened by filling the cracks and voids.

112. KIRTINARAYANA TEMPLE, TALKAD, DISTRICT MYSORE.—The main image of the sanctum which had gone out-of-plumb was reset in position. Accretionary cement concrete floor of the *navaranga, sukanasi* and *garbha-griha* was replaced by stone flooring. Dislodged and sunken stone flooring of the *jagati* platform around the temple was reset and the joints were pointed. The accretionary lime-wash from the ornamental pillars and black soot from the ceiling of the *garbha-griha* were removed.

113. MADHUKESVARA TEMPLE, BANAVASI, DISTRICT NORTH KANARA.—The fallen *prakara-wall* on the southern side was reconstructed as per the original. The area on the eastern side of the temple was levelled to facilitate free flow of water.

114. TRIMURTINARAYANA TEMPLE, BANDALIKE, DISTRICT SHIMOGA.—The dislodged *sukanasa* of the main *sikhara* was rebuilt as per the original with available stone materials. The veneer stones of the *garbha-griha* which had gone out-of-plumb were reset and the remaining walls of *garbha-griha* were strengthened by grouting the joints and pointing.

The work of resetting the northern *sikhara* which had gone out-of-plumb has been undertaken. The sunken stone slabs of the *navaranga* were also reset.

The eastern wall of the *natya-mandapa* which was in a dilapidated condition was reset. The roof was made water-tight by laying weather-proof courses in place of dead concrete.

115. MUSAFIRKHANA AND HONDA, SANTEBENNUR, DISTRICT SHIMOGA.—The leaky terrace was made water-tight.

116. CHENNAKESAVA TEMPLE, NAGALAPUR, DISTRICT TUMKUR.—The platform around the temple was made water-tight by providing stone pavement.

NORTHERN CIRCLE

Uttar Pradesh

117. FORT, AGRA, DISTRICT AGRA.—The walls and floors of *dalans* around the Diwan-i-Am quadrangle have been pointed with lime-mortar. The walls have been underpinned with *lakhauri* bricks. The moulded plaster was also restored at places.

A deep and wide crack in the south-east corner bastion of the fortification-wall has been stitched. Missing veneering and coping stones have been provided and loose bulged-out stones reset in position (pl. XLIV).

The side walls of the rampart road leading from Amar Singh Gate to Diwan-i-Am have been pointed and plastered. Missing and broken veneering stones have also been replaced with new stones in the balcony of the second fore-court.

The work of reproducing the decayed floral designs and fixing of convex glass mirrors have been attended to in the south wall of the southern room of Shish Mahal.

118. JAMI MASJID, AGRA, DISTRICT AGRA.—Decayed and missing stones of the flooring of the prayer-hall in the southern bay was restored with new ones. Dislodged and broken *chhajjas* and brackets in the northern wing of the courtyard have been replaced. The deep wide cracks in the domed ceiling of the northern and central bays have been stitched by providing stone *bidies,* grouting and filling of cracks. The moulded plaster-design has also been restored. The domes of the miniature *chhatris* have also been plastered.

119. TAJ MAHAL COMPLEX, AGRA, DISTRICT AGRA. —The decayed and damaged stones of the inner spiral steps of the south-western *minor* and the veneering stones of Taj Mahal have been replaced. Fresh inlay pieces on the neck of the main dome and wall on the river side have been provided and water-tightened.

The damaged *lakhauri* brick wall of Khane-i-Alam Nursery has been restored and pointed. The pillars and channel of the old water-system have been underpinned by *lakhauri* bricks. The decayed plaster of the domed ceiling has been replaced by fresh one.

The decayed stones of the *dasa* and *chhajja* and the decayed plaster of the south-western Saheli Burj have been replaced by new ones.

120. FORT, FATEHPUR SIKRI, DISTRICT AGRA.—Missing and broken flagstones and *dasa* stones of Ibadat Khana were replaced with new ones. The Turkish Sultana's bath was subjected to underpinning, pointing and edging. The massive wall between Astrologer's seat and the Panch Mahal was made water-tight.

The richly-carved ornamental pillars of the niche towards west of the main entrance porch of Jodha Bai complex were replaced with new ones. Red sandstone *jali* on original geometrical pattern has been prepared to be fixed to the Hawa Mahal.

Restoration of collapsed and fallen parapet and retaining wall along the road has been done. The wide and deep joints of the parapet have been filled up after underpinning the masonry at places.

The dilapidated compound-wall of the Stone-cutter's mosque has been pointed and the sunken floor of the mosque reset.

121. ASOKA'S ROCK-EDICT, KALSI, DISTRICT DEHRADUN.—Cement concrete block-edging has been provided on the pathways.

122. KALINGA MONUMENT, KARAMPUR, DISTRICT DEHRADUN.—The collapsed portion of the retaining wall in south-east corner has been restored.

123. ROCK-CUT IMAGES OF JAINA TIRTHANKARAS, MAHOBA, DISTRICT HAMIRPUR.—Random rubble stone masonry has been provided for balancing the load of cantilever slab which has been plastered in colour simulating rock surface.

124. TEMPLE, SIGARI, DISTRICT HAMIRPUR.—The bulged-out steps and *ghats* of the temple and dislodged members of the *sikhara* of the temple have been reset in position. The roof has been made water-tight.

125. BRAHMANICAL AND JAINA TEMPLES, SUKURA, DISTRICT HAMIRPUR.—The dislodged flagstones have been taken out and reset in position and open joints of masonry and flooring have been filled up and pointed.

126. RAJA GANGADHAR RAO'S CHHATRI, JHANSI, DISTRICT JHANSI.—The central pathway leading to the *samadhi* has been provided with flagstone apron. The roof, *chhajjas* and the apron of the *samadhi* have been made water-tight (pl. XLV). The decayed plaster of the parapet-wall was restored in patches. The damaged figure in plaster in the central structure over the northern compound-wall has been restored.

127. RANI LAKSHMI BAI PALACE, JHANSI, DISTRICT JHANSI.—Flagstone pavement has been provided to the passage from the main gate towards the fountain-cistern.

128. BRICK TEMPLE, BHITARGAON, DISTRICT KANPUR.—The vegetation over the temple has been removed.

129. KACHERI CEMETERY, KANPUR, DISTRICT KANPUR.—The accumulation of debris at places has been removed. The vegetation and debris have been removed from the graves and the railing around the graves pointed.

130. BELMORI TEMPLE, CHANDPUR, DISTRICT LALITPUR.—The dislodged lintels, beams and pillars of the *mandapa* in the north of the temple have been reset and rendered water-tight.

131. GUPTA TEMPLE, DEOGARH, DISTRICT LALITPUR.—The plinth of the temple has been made water-tight. The stone masonry wall of the *badi* adjacent to the temple has also been repaired and rendered water-tight.

132. GROUP OF TEMPLES, DUDHAI, DISTRICT LALITPUR.—The Jaina temple, Chhoti Surahi temple and Siva temple have been subjected to pointing wherever felt necessary.

133. BIBIAPUR HOUSE, LUCKNOW, DISTRICT LUCKNOW.—The collapsed roof-terrace of the room in the south-western wing has been restored by replacing the wooden beams and rafters and providing earthen tiles and a layer of lime concrete with brick ballast.

134. CEMETERY OF ALAM BAGH, LUCKNOW, DISTRICT LUCKNOW.—The collapsed portion of the southern side of the compound-wall has been restored. The damaged portions of moulded plaster have been reproduced over the compound-wall.

135. NADAN MAHAL, LUCKNOW, DISTRICT LUCKNOW.—The graves towards the south of the main structure have been underpinned with *lakhauri* bricks and coated by a concrete of brick ballast, *surkhi* and lime.

136. RESIDENCY, LUCKNOW, DISTRICT LUCKNOW.—The wall-tops of the Residency buildings have been made water-tight. The masonry wall has been underpinned by *lakhauri* bricks. The collapsed portion of the compound-wall has been restored.

NORTH-WESTERN CIRCLE

Haryana

137. FIROZSHAH PALACE COMPLEX, HISSAR, DISTRICT HISSAR.—The terrace of the mosque was made water-tight.

138. KABULI MOSQUE, PANIPAT, DISTRICT KARNAL.—Broken and missing portions of the mosque was restored by underpinning of walls and arches with bricks in lime-mortar.

Jammu and Kashmir

139. SUN TEMPLE, MART AND, DISTRICT ANANTNAG.—The newly acquired land on the background of the temple was fenced. Pathways were provided on the front and western sides of the temple.

140. BUDDHIST MONASTERY, ALCHI, DISTRICT LEH.—The fallen portions of the compound-wall of the monastery were reconstructed with rubble stonework in mud mortar as per original.

Bulged-out and fallen patches of walls of Lakhang-Soma *gumpha* were restored and the surface provided with fresh mud plaster.

Fallen portions of brickwork of some *chortens* were restored, top surface made water-tight and outer surface provided with fresh mud plaster mixed with cowdung and *bhusa* in conformity with the original.

Besides, the entire area of the monastery was cleaned and dressed up after removing vegetation and debris.

141. LAKHANG GUMPHA, LAMAYURU, DISTRICT LEH.—The Lakhang *gumpha* at Lamayuru was taken up for repairs for the first time after its proposed protection by the Survey. The leaking roof of the *gumpha,* which contains ancient paintings on interior walls, was made water-tight after removing loose earth, by providing alkathene sheets and fresh earth. The surface of roof and the exterior walls were finished with mud plaster mixed with cowdung and *bhusa* as per original. Rain-water gutters were also provided for the outlet of rain-water. Damaged and cracked portions of exterior and interior walls were stitched and plastered. Plinth protection and drains were provided to check seepage of rain water into the structures. The surroundings of the *gumpha* were improved by removing accumulated debris, rank vegetation and dressing the area.

142. OLD CASTLE, LEH, DISTRICT LEH.—The dilapidated and fallen retaining wall of the old castle situated on a high hillock was reconstructed with rubble stones. Leaking roof of the temple inside the castle was made water-tight. Cracks formed in its walls were also stitched. The surface of the roof was finished with mud plaster mixed with cowdung and *bhusa* matching with the original surface. Fresh plaster was laid after removing the dead plaster on all the outer walls. Besides, surroundings of the castle were properly dressed.

143. MOSQUE OF AKHUN MULLA SHAH, HARI PARBAT, DISTRICT SRINAGAR.—Accumulated earth and debris were removed from the roof of the cells on the northern side and facade of the cells was pointed with lime-*surkhi* concrete mortar. Besides, missing portions of compound-wall were restored with ashlar stonework.

144. BUDDHIST SITE, HARWAN, DISTRICT SRINAGAR.—In continuation of last year's work *(1980-81,* p. 139), the debris was mostly cleared, area excavated and large boulders broken to reclaim the buried structures and built-up tiles.

145. PARI MAHAL, SRINAGAR, DISTRICT SRINAGAR.—Fresh rubble stonework in lime-cement mortar was provided on the top portion of the retaining wall of the fourth terrace. The front and eastern side of the retaining wall was also recess-pointed (pl. XLVI).

146. PATHAR MASJID, SRINAGAR, DISTRICT SRINAGAR,—Fresh plaster, after scrapping out the modern colour-wash, was applied on the inner walls, pillars and ceiling of the central bay

of the prayer-hall. Besides, all the moulded and ornamental work in plaster was also restored.

147. SULTAN ZAIN-UL-ABDIN'S MOTHER'S TOMB, SRINAGAR, DISTRICT SRINAGAR.—The dislodged stones of the compound-wall were dismantled and a portion completely reconstructed.

148. TEMPLE COMPLEX, WANGATH (NARANAG), DISTRICT SRINAGAR.—The enclosure-wall was exposed after removal of debris and large stones. During clearance a miniature shrine was exposed.

149. KALA DERA TEMPLES 1 AND 2, BABORE, DISTRICT UDHAMPUR.—The dislodged and out-of-plumb stones of the wall, pillars and lintels of the entrance and *mandapa* of the temples were dismantled and reconstructed (pl. XLVII).

Punjab

150. MUGHAL SARAI, AMANAT KHAN, DISTRICT AMRITSAR.—Moulded and ornamental brick-work in *lime-surkhi* mortar was restored after dismantling the dislodged brick-work at the western gate-house of the Sarai.

151. RAM BAGH GATE, AMRITSAR, DISTRICT AMRITSAR.—The dead plaster was completely removed from the outer walls of eastern and northern sides and gateway and fresh *lime-surkhi* plaster applied. Besides, ornamental and floral motifs, moulded arch-panels and cornices were also restored.

152. FORT, BHATINDA, DISTRICT BHATINDA.—Rank vegetation was removed from the outer and inner fortification-walls, bastion and rampart.

153. MUGHAL SARAI, NURMAHAL, DISTRICT JULLUNDER.—The leaking vaulted roof of the *dalan* of the main front gate-house of the Sarai was relaid with concealed R.C.C. slab and surface restored with lime-concrete. Fresh lime-concrete has also been laid on a portion of the roof of the cells of the Sarai.

SOUTHERN CIRCLE

Kerala

154. BEKAL FORT, PALLIKERE, DISTRICT CANNANORE.—The original fort-wall of laterite stones is being made water-tight by relaying the disjoined and loose topmost four courses.

155. MATTANCHERRY PALACE, COCHIN, DISTRICT ERNAKULAM.—New teak-wood doors were provided in place of the decayed ones. Granite cut-stone slabs were introduced as a damp-proof course in the laterite walls bearing mural paintings. The external surface of the walls of the palace was given a face-lift.

156. ST. FRANCIS CHURCH, COCHIN, DISTRICT ERNAKULAM.—The leaky roof of the altar portion of the church was dismantled and reset.

Pondicherry

157. MULANATHASVAMI TEMPLE, BAHROO, DISTRICT PONDICHERRY.—The stucco figures over the *vimana* of the temple were strengthened, mended and toned up suitably.

158. VARADARAJAPERUMAL TEMPLE, TIRUBHUVANAI, DISTRICT PONDICHERRY.—The joints of the stone wall of the main shrine were recess-pointed after raking out the old ones. The ceiling of the *vahana-mandapa, mandapalli* (kitchen) and store-room were also replastered.

159. SRI PANCHANADISVARA TEMPLE, TIRUVANDAR KOIL, DISTRICT PONDIGHERRY.—To drain out rain-water from the temple premises, the area was suitably levelled.

Tamil Nadu

160. IRAVATANESVARA TEMPLE, KANCHIPURAM, DISTRICT CHINGLEPUT.—The broken beam inside the *mandapa* was given a suitable support. The damaged flooring was reset and pointed. The accretionary side walls were removed.

161. KAILASANATHA TEMPLE, KANCHIPURAM, DISTRICT CHINGLEPUT.—The eroded area at the north-west was filled up and retained by stone pitching.

162. OLAKANNESVARA TEMPLE, MAHABALIPURAM, DISTRICT CHINGLEPUT.—The wide cracks on the surface of the rock by which water was leaking into the Mahishamardini cave were closed by injecting cement slurry and sealing with epoxy concrete. The top was covered with concrete.

163. BIG WAREHOUSE IN FORT ST. GEORGE, MADRAS, DISTRICT MADRAS.—Temporary supports with iron rails were provided to the decayed joints to save the roof from collapsing.

164. DELHI GATE, ARCOT, DISTRICT NORTH ARGOT.—The original floor-level in the cells of the Delhi gate was exposed and a brick flooring was provided.

165. SOMANATHA TEMPLE, MELPADI, DISTRICT NORTH ARCOT.—The undulated stone flooring within the inner *prakara* around the main shrine was removed and reset over a sand bed after dressing the uneven stones and the joints were recess-pointed. The original mouldings with inscriptions were exposed after removing the accretionary basement in front of Dakshinamurti on the southern side of the main temple.

166. ROCK-CUT CAVE, NARASAMANGALAM, DISTRICT NORTH ARCOT.—The accretionary walls in front of the cave were removed.

167. SRI CHANDRAMAULISVARA TEMPLE, NATTERY, DISTRICT NORTH ARCOT.—In continuation of last year's work *(1980-81,* p. 143) the stones of the bottom layers of the walls of the *maha-mandapa* and *gopura* were carefully removed and stacked for reuse. Spread footing foundation was provided for the walls of the *maha-mandapa* and *gopura.* The foundation consists of two courses of masonry footing with sufficient offsets below the base course of walls. As the soil is very soft and ground water-table is very high, a reinforced concrete slab was laid below the masonry footing to ensure the stability of the structure. The stones of the bottom-most layers were relaid in their original position over the footing and the reconstruction of the walls is in progress (pl. XLVIII). The broken architectural members and stones carrying the inscriptions were mended.

Resetting the out-of-plumb architectural members of the *vimana* was also taken up after documentation. The stones were removed layer by layer and reset. The crevices were filled, joints pointed and the top of each *tola* was made water-tight (pl. XLIX).

168. JAINA SCULPTURES AND INSCRIPTIONS, VALLIMALAI, DISTRICT NORTH ARCOT.—The joints of the stone flooring in front of the cave were recess-pointed with combination mortar. The undulated steps leading to the cave from the foot-path were reset.

169. SUBRAHMANYASVAMI TEMPLE, VALLIMALAI, DISTRICT NORTH ARCOT.—The out-of-plumb retaining wall in stone was dismantled and reconstructed and a coping was provided. The courtyard in front of the temple was paved with stone flooring over a sand base. The brick *vimana* was made water-tight.

170. FORT, VELLORE, DISTRICT NORTH ARCOT.—The wide joints of the inner face of the rampart-wall near the temple were pointed after removing rank vegetation and filling the gaps.

171. AIVARKOIL, KODUMBALUR, DISTRICT PUDUKKOTTAI.—The out-of-plumb portion of the basement was dismantled. The resetting is in progress.

172. SIKHANATHASVAMI TEMPLE, KUDIMIAMALAI, DISTRICT PUDUKKOTTAI.—The disinte grated and broken wooden beams, pillars, capitals and planks in the inner *gopura* were replaced with new teak-wood members.

173. NARASIMHASVAMI TEMPLE, NAMAKKAL, DISTRICT SALEM.—The fallen debris of the compound-wall (Thirumadil) on the northern side of the temple was removed and the wall was reconstructed as per the original. A brick coping plastered with combination mortar was provided.

174. FORT-WALL, GINGEE, DISTRICT SOUTH ARCOT.—Reconstruction of the fallen portion of the fort-walls and bastions of Krishnagiri and Rajagiri with available stones and core-filling with rubbles in combination mortar is in progress.

175. KRISHNAGIRI FORT, GINGEE, DISTRICT SOUTH ARCOT.—To prevent the growth of vegetation, the rubble pitching on the slopes on either side of the entrance of the fort was pointed suitably.

176. VENKATARAMANA TEMPLE, GINGEE, DISTRICT SOUTH ARCOT.—The missing and broken ceiling-slabs of the *kalyana-mandapa, utsava-mandapa* and pillared hall were replaced by new ones. The open courtyard was paved with granite flooring-slabs over a base of brick jelly concrete.

To drain out the rain-water into the moat, in continuation of the old work, the sides and bottom of the open drain were pitched in rough stone masonry and joints pointed in combination mortar.

177. NITHISVARASVAMI TEMPLE, SRIMUSHNAM, DISTRICT SOUTH ARCOT.—The weathered plaster over the walls of the *madapalli* (temple-kitchen) was replaced by new plaster. The leaky roof of the *madapalli* and *ardha-mandapa* was made water-tight by laying fresh brick jelly concrete in combination mortar and then laying two courses of flat tiles in combination mortar with 10% crude oil and top plastered with necessary slope to drain out rain-water.

178. AIRAVATESVARA TEMPLE, DARASURAM, DISTRICT THANJAVUR.—To prevent the stagnation of rain-water, stone flooring was provided around the Amman shrine with new stone slabs over a bed of brick jelly concrete set in cement mortar and the joints were pointed in combination mortar. The work is in progress.

179. BRIHADISVARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR.—Grilled screens were provided along the western side of the southern cloister *mandapa* for shifting the temple-*vahanas* from the front hall of the Subrahmanya temple.

180. THENKAILASANATHASVAMI SUB-SHRINE OF BRIHADISVARA TEMPLE, GANGAIKONDACHOLA-PURAM, DISTRICT TIRUCHIRAPPALLI.—The dislodged stones of the basement and the undulated stone flooring of the front open *mandapa* were reset over a bed of brick jelly concrete basement in combination mortar. The joints were pointed. The roof-slabs and stones of the out of plumb walls were dismantled carefully for resetting. Fresh stones have been selected and dressed for use at places where they are missing. The work is in progress.

181. THIRUVALISVARA TEMPLE, BRAHMADESAM, DISTRICT THIRUNELVELI.—The badly-damaged and undulated stone flooring in Amman shrine was taken out and reset.

SOUTH-EASTERN CIRCLE

Andhra Pradesh

182. ANJANEYASVAMI TEMPLE, CHANDRAGIRI, DISTRICT CHITTOR.—The dead concrete from the terrace was dismantled and the missing stone slabs were replaced. The concrete was relaid and the surface plastered.

SOUTH-WESTERN CIRCLE

Goa, Daman and Diu

183. ANCILLARY BUILDING, CHURCH OF ST. FRANCIS OF ASSISI, OLD GOA.—The overhanging laterite stone masonry was underpinned in cement mortar. The open portion between the walls and R.C.C. beam was filled up with brickbats in cement mortar and plastered. The outer walls were replastered with a mixture of waterproofing compound. The missing wooden frames were replaced. The outer laterite apron was provided on C. C. bed with recessed pointing to stop percolation of water into the foundation.

184. ANCILLARY BUILDING, BASILICA OF BOM JESUS, OLD GOA.—The sunken stone flooring was relaid. The walls were replastered in cement mortar. The seepage of the roof over the verandah was stopped by applying waterproofing compound. Asbestos sheets, A. C. pipes were provided to drain off rain-water. The work is in progress.

185. BASILICA OF BOM JESUS, OLD GOA.—Plastering of interior and exterior walls, colour ing and painting are in progress. To stop seepage of water, waterproofing compound is being applied to the roof.

186. TANK IN FRONT OF SAFA MASJID, PONDA, DISTRICT GOA.—The collapsed steps of the tank are being reset.

Maharashtra

187. BIBI-KA-MAQBARA, DISTRICT AURANGABAD.—The out-of-plumb brick-built screen-wall around the main tomb of Rabia Durrani was dismantled and reconstructed. The decayed

plaster of the main tomb was removed and replastering done. Besides, the worn-out stones of the pavement in front of the gate of Maqbara are being reset.

188. MANDAPESVARA CAVE, BORIVLLI, DISTRICT BOMBAY.—The rank vegetation has been removed and a drain laid in cement concrete for outlet of rain-water.

189. JOGESHVARI CAVES, JOGESHVARI, DISTRICT BOMBAY.—The percolation of water inside the cave was traced and the spongy rock was treated with 'Expoxy Resin' and concrete laid. The drain-water flowing over the back is being stopped.

190. CAVES, KONDIVATE, DISTRICT BOMBAY.—After clearing the vegetation, the treatment in R.C.C. in Cave 1 is in progress.

191. LAKHUJI JADHAV SAMADHI, S'NKHED RAJA, DISTRICT BULDHANA.—The roof was made water-tight by concreting and filling the gaps.

192. KOPESVARA MAHADEVA TEMPLE, KHIDRAPUR, DISTRICT KOLHAPUR.—The original paved surface was exposed to relay stone pavement. The modern accretions like Nagarkhana are being dismantled. The removal of concrete slabs from the roof of the *natya-mandapa* is in progress.

193. SHIVNERI FORT, JUNNAR, DISTRICT POONA.—Rebuilding of fallen fortification-wall is in progress.

194. JIJA-MATA-WADA, PACHAD, DISTRICT RAIGAD.—Fallen stone masonry has been reconstructed.

195. RAIGAD FORT, RAIGAD, DISTRICT RAIGAD.—After clearing the vegetation from the fort-wall, the fallen portions of Bazarpeth were reconstructed. Water-tightening and restoration are in progress.

196. ANCIENT MOSQUE, DABHOL, DISTRICT RATNAGIRI.—The thick spongy lime-plaster of the dome was scrapped and replastering in cement mortar executed. The concrete was also scrapped and is being relaid with an appropriate slope to drain out water.

WESTERN CIRCLE

Goa, Daman and Diu

197. CHURCH OF HOLY JESUS, MOTI DAMAN, DAMAN.—In continuation of last year's work *(1980-81,* p. 146), the damaged and missing Mangalore tiles and the decayed wooden battens and ceiling were dismantled and replaced by new ones as per the original design. The dead lime-plaster was removed and new plaster with *neeru* finish was provided. The damaged electrical fittings were removed and replaced by new ones. The work is in progress.

198. FORT WALLS, NANI DAMAN, DAMAN.—The dead lime-concrete on the top of the fort-wall on northern side was removed and fresh concrete with plaster in conformity with the original was provided. The damaged parapet-wall was rebuilt. Missing wooden lintels were provided with teak-wood lintels as per the original.

199. SAINT PAUL'S CHURCH OUTSIDE THE FORT, DIU.—The flooring which had sunken was removed and relaid with lime-concrete. The vaulted roof was made water-tight.

Gujarat

200. RAIPUR GATE, AHMADABAD, DISTRICT AHMADABAD.—The cracked and out-of-plumb ashlar stone masonry on the north-west corner portion of the gate was dismantled and reconstructed. The fallen brickwork hearting was reconstructed in lime-mortar with old brick facing.

201. SUN TEMPLE, MODHERA, DISTRICT MEHSANA.—To stop seepage of rain-water into the foundation, stone apron was provided on concrete-bedding on the southern side of the *nritya-mandapa.*

Rajasthan

202. AKBARI MASJID, AMBER, DISTRICT JAIPUR.—The flooring of the mosque, damaged during the floods was provided with lime-concrete base and plastered with Makrana marble finish as per the original. After removing the decayed plaster fresh plaster in limecement mortar with fine marble finish and reproduction of necessary floral designs and mouldings was provided. The damaged minarets of the main hall were reconstructed.

203. JAGAT-SIROMANI TEMPLE, AMBER, DISTRICT JAIPUR.—The damaged steps and the platform with flooring were made water-tight. Plaster-work wherever missing in the floor of the *sabha-mandapa* was undertaken.

204. TEMPLE CONTAINING FRESCO PAINTINGS, GALTAJI, DISTRICT JAIPUR.—The debris accumulated due to recent floods was removed. The cavities in the basement of the structure were underpinned and plastered (pi. L). The cracked roof-slabs of the adjacent room were replaced with new ones and lime-cement concrete was laid on the top. The entire roof was made water-tight by tarfelt treatment

MONUMENTS MAINTAINED BY THE STATES

GUJARAT The work of special repairs

was undertaken at the following monuments.

1. LAKHOTA, JAMNAGAR, DISTRICT JAMNAGAR.
2. MAHOBATKHAN, JAMNAGAR, DISTRICT JAMNAGAR.
3. BHIMCHORI (SIVA TEMPLE KALESVARI), LAVANA, DISTRICT PANCHMAHALS.
4. SIVA TEMPLE NO. 1, SANT, DISTRICT PANCHMAHALS.
5. CAVES, KHAMBHALIDA, DISTRICT RAJKOT.
6. LAKHENA JAINA TEMPLE, ABHAPUR, DISTRICT SABARKANTHA.
7. SHARNESVAR TEMPLE, ABHAPUR, DISTRICT SABARKANTHA.

8. PANCHAYATANA TEMPLE OF SIVA, BHETALI, DISTRICT SABARKANTHA.

9. KUND, GAMBHIRPURA, DISTRICT SABARKANTHA.

10. STEP-WELL, LIMBOI, DISTRICT SABARKANTHA.

11. SIVA TEMPLE, VASAI, BHETALI, DISTRICT SABARKANTHA.

12. STEP-WELL, HAMPUR, DISTRICT SURENDRANAGAR.

13. TEN-TALAV, TEN, DISTRICT VADODARA.

JAMMU AND KASHMIR

14. TOMB AND MOSQUE OF MADIN SAHIB, HAWAL, DISTRICT SRINAGAR.—The fencing work of the premises of the tomb and mosque is in progress.

KARNATAKA

The conservation works at the following monuments have been undertaken.

15. VIRUPAKSHA TEMPLE, HAMPI, DISTRICT BELLARY.

16. REMAINS, NAGAI, DISTRICT GULBARGA.

17. CHANNAKESAVA TEMPLE, HULIKERE, DISTRICT HASSAN.

18. SANTINATHA BASADI, JINANATHAPURA, DISTRICT HASSAN.

19. MAHABALESVARA TEMPLE, CHAMUNDI HILLS, DISTRICT MYSORE.

20. BHUVANESVARI TEMPLE, MYSORE FORT, DISTRICT MYSORE.

21. KODI-SOMESVARA TEMPLE, MYSORE FORT, DISTRICT MYSORE.

22. VARAHASVAMI TEMPLE, MYSORE FORT, DISTRICT MYSORE.

23. PRASANNA-KRISHNASVAMI TEMPLE, MYSORE PALACE, DISTRICT MYSORE.

MAHARASHTRA

Conservation works were taken up at the following monuments.

24. MANSION OF RAGHOBADADA, KOPARGAON, DISTRICT AHMEDNAGAR.

25. MAKAI GATE, AURANGABAD, DISTRICT AURANGABAD.

26. KEVALA-NARASIMHA TEMPLE, RAMTEK, DISTRICT NAGPUR.

27. FORT, SINHGAD, DISTRICT PUNE.

Clearance work was undertaken at the following monuments.

28. RAJWADA COMPLEX, SINDKHEDRAJA, DISTRICT BULDHANA.

29. RAJGAD, DISTRICT PUNE.

RAJASTHAN

The works of conservation and clearance were carried out at the following monuments.

30. AMBER PALACE, DISTRICT JAIPUR.

31. RAJA BHARNALS' CHHATRI, AMBER, DISTRICT JAIPUR.

32. CAITOR-KI-CHHATRI, JAIPUR, DISTRICT JAIPUR.

33. HAWA MAHAL, JAIPUR, DISTRICT JAIPUR.

34. JANTAR-MANTAR, JAIPUR, DISTRICT JAIPUR.

35. MAHARANI'S CHHATRIES ON JAIPUR-AMBER ROAD, DISTRICT JAIPUR.

36. NAHARGARH FORT, JAIPUR, DISTRICT JAIPUR.

37. PATWA HAVELIES, DISTRICT JAISALMER.

38. MUSEUM BUILDING, JAISALMER, DISTRICT JAISALMER.

39. DEVATAON-KI-SAL, MANDORE, DISTRICT JODHPUR.

40. TEMPLE, OSIAN, DISTRICT JODHPUR.

41. TEMPLE, VARMAN, DISTRICT SIROHI.

WEST BENGAL

42. BASULI TEMPLE, ATBHAICHANDI, DISTRICT BANKURA.—The foundation of the temple has been consolidated. The main sanctum has been reconstructed with laterite stones on original pattern. The surroundings have been properly dressed.

43. CHANDRANATHA SIVA TEMPLE AND DEWANJI SIVA TEMPLE, HETAMPORE, DISTRICT BIRBHUM.—The flood-affected platform of the Chandranatha Siva temple was restored by relaying mortar. The roof-top has been made water-tight. The damaged plinth of the Dewanji temple has been consolidated. An enclosure-wall with provision for circumbulatory path has been constructed.

44. SIVA TEMPLE, RAMNAGAR, DISTRICT BIRBHUM.—The flood-affected parts of this temple have been completely restored by relaying mortar on the roof-top. The platform at the plinth-level has been reconstructed.

45. JAMI MOSQUE, OLD MALDA, DISTRICT MALDA.—The cracks on the roof-top and walls, both inside and outside, have been stitched. The surrounding area has been dressed.

46. PATHAN PALACE AT ADINA, DISTRICT MALDA.—The conservation of the ruins of the palace is in progress.

X. EXPEDITION OUTSIDE INDIA

A team of nine members of the Survey under K. M. Srivastava visited Kampuchea in the month of February 1982 to prepare a comprehensive project report on the preservation of the temple of Angkor Wat, which is a monument of international importance. The team stayed in Kampuchea for a period of four months during the course of which two laboratories, one chemical and the other photographic, were also established. The materials and equipments for the laboratories were sent earlier by the Survey.

The temple of Angkor Wat, dedicated to Vishnu, was built by the illustrious Khmer king, Suryavarman II, who ruled at Angkor between AD 1113 and 1150. It is a triple-terraced monument with surrounding galleries, cruciform courts and five towers looking like peaks. The five central towers of the temple represent symbolically the five peaks of Mount Meru, the abode of the gods, and the extensive moat all around, the waters of the ocean.

PROBLEMS.—Vagaries of nature and prolonged neglect were observed to be the root causes of rapid deterioration of the great temple in recent times. Rampant growth of vegetation affected the monument adversely by disturbing the joints between the slabs. The roots penetrated into the structure deep enough to dislodge the stones. The implacable jungle threatened the very existence of the monument. The heavy monsoons in the region played a havoc in mercilessly eroding all parts of the monument. The softer clayey component of the sandstone was washed away, rendering the structure as a whole very weak. Erosion has affected the fabric of the monument to such a great extent that the sandstone slabs are flaking layer by layer. In certain parts of the north-eastern tower in the first enclosure the effect of erosion is to such a great extent that the ornamentation and the *apsaras* have been washed away completely (pl. LI A). Once the entire make-up of the structure was disturbed by the rampant growth of vegetation, the regular and heavy percolation of water accelerated the deterioration of the monument, besides undermining its strength and durability. The percolated rain-water accumulated on the floor, got into the joints along with the accumulated dust and ultimately acted like explosion in the form of expansion. As a sequel, the stones used were dislodged and the masonry of the superstructure could not stand in its proper position, sometimes collapsing completely (pl. LI B). Seepage of water and the resultant sinking of the earth filling of foundation is not a general ailment of the monument. It is restricted to particular areas, specially the gallery of the third exclosure. It is the worst affected part of the monument. All the pillars in the gallery have sunk along with the horizortal slabs between them on account of seepage of water. With the sinking of the pillars of the main gallery the smaller pillars of the semi-vaulted gallery in front have fallen out-of-plumb with their thrust outside. The tie-beams have also broken (pl. LII A). Further, the fine joints of the stone slabs used in the floor of the gallery have developed yawning gaps. In addition to seepage, insects have also played a role in weakening the foundation of the pillars. They get into the open joints and bring out in large quantities the earth filled in the foundation.

Bio-chemical problems are another factor, which has accelerated the deterioration of the monument further. Growth of micro-organisms like moss, various types of lichens and algae (pl. LII B), besides disfiguring the monument badly, caused the weathering of sandstone. Heat of the tropical country also played a significant role in the deterioration of the monument. Exfoliation of the stone surface as a result of sharp variation in the day and night temperatures has adversely affected the balustrades and the horizontal upper surfaces of the plinth.

MEASURES OF CONSERVATION.—Vegetation has always acted as the greatest enemy of any structure. Hence, the monument should be completely eradicated of the vegetation followed by steps to stop further growth. The ceiling in every part of the monument should be carefully pointed, so as to stop any percolation of water. Wide cracks observed almost in every part of the

monument should be filled up by grouting and narrow cracks by pointing. The badly-dislodged portions of the monument will have to be dismantled and reset with the help of dowels and minimum use of cement mortar. Wherever the stones are not badly dislodged they can simply be reset. This measure will have to be adopted particularly in case of high plinth and gable-ends of the ceiling. The ceiling of the semi-vaulted gallery and half of the vaulted ceiling of the third enclosure, where the pillars have sunk, will have to be dismantled in the first instance. To strengthen the foundation of the pillars a stone slab above the laterite slab has to be provided to prevent any future sinking. Cement concrete bedding in a similar manner is to be provided between the sunken sandstone slab and laterite block. These works are to be undertaken with great care; before dismantling, the stones are to be marked systematically and photo-documented. In certain portions of the third enclosure, where the sinking is minor, dismantling may not be necessary. The works can be executed after giving full support to the vaulted ceiling of the main gallery with the help of jacks. The broken tie-beams of the semi-vaulted gallery are to be repaired. The floor-slabs with wide gaps are to be taken out and reset in proper position. In certain areas some chiselling may also have to be done. Pointing should be taken up after resetting the slabs. At a large number of places part of the masonry has collapsed weakening the adjoining structure. Such parts should be restored with the help of available stones. The open area is to be dressed up with a proper slope for easy drainage of water, so that water is not allowed to seep into the foundations. After dressing the open courtyards properly a suitable lawn may be laid out.

After the structural repairs are completed, the work of removal of moss, lichen and algae from the surface of the stones should be undertaken. A 5% solution of ammonia (prepared by suitably diluting liqour ammonia of specific gravity 0-88 with distilled water) will be used for softening them. They will be ultimately removed by scrubbing with a coir or nylon brush of the requisite hardness. The stone surface will thereafter be thoroughly rinsed with plain water. A non-ionic surface re-agent like Lissopol-N may be used in 1 to 2% solution in water for further facilitating the removal of the growth of accretions. While scrubbing care must be taken to see that the friable stone surface is not damaged.

After chemical cleaning is completed, the stone surface of the monument is to be treated with a fungicide/herbicide for preventing further growth of micro-vegetation and the application has to be repeated every few years, as required. For this purpose either a 5% aqueous solution of Zinc Silico Fluoride or a 2% solution of Sodium Penta Chloro Phenate may be used. It would be convenient to spray the fungicidal solution on to the stone surface.

Taking into consideration all relevant aspects, Epoxy resin has been recommended for the consolidation work of the stone surface. Araldite CY 212 with Hardener HY 951, suitably diluted to the required consistency with Methyl Ethyl Ketone, may be used. A suitable *in situ* vaccum impregnation technique would be most appropriate for the consolidation, if the same could be devised. In case no such device was possible, the other alternate method would be to warm up the stone surface with the help of infra-red lamps before such application of the consolidation fluid, so that the rock pores get expanded allowing it to go deep inside.

The final step in the treatment is the application of preservative. The use of 1 % solution of Polymethyl methacrylate in toulene has been recommended for the purpose.

Since rain-water is playing a major role in the weathering of the stone, a coat of water-repellant formulation may be used as a final measure so that the impinging rain-water would slip off the surface.

Earlier in October 1980 a small team consisting of R. Sengupta^ B. N. Tandon and R. K. Dutta Gupta visited Kampuchea to report on the damage to the temple of Angkor Wat and other moduments. In persuance of their recommendations three persons from Kampuchea were given training in conservation and photography. Some equipments and instruments were also made available to them to start documentation and preliminary works on preservation.

XI. ARCHAEOLOGICAL CHEMISTRY

TREATMENT OF MONUMENTS AND PAINTINGS[1]

ANDHRA PRADESH

1. VIRABHADRASVAMI TEMPLE, LEPAKSHI, DISTRICT ANANTAPUR.—In continuation of last year's work *(1980-81,* p. 154) the sculptures and mural paintings of this famous temple were treated chemically, thereby bringing out the details clearly. Thick vegetation growth like moss, lichen and grease, oily accretion, soot, dust, dirt, cobwebs, bats' excreta etc, on sculptures and architectural members were eradicated with the help of 3 per cent aqueous ammonia plus teepol non-ionic detergent, while the lime-wash on columns and walls had been removed by means of 3 per cent acetic acid solution in water. With the help of 3 per cent Rustodine 250, the red ochre adhering to pillars etc., was removed to a great extent. Finally the treated surface was given fungicidal coat with 3 per cent solution of sodium pentachlorophenate followed by an application of 3 per cent preservative coat of polyvinyl acetate in toluene.

The dust, dirt, smoke, soot and the old preservative on the murals on the ceilings had been removed by various chemicals like acetone, benzene, cellosolve triethanolamine etc. The treated surface was duly preserved with 3 per cent polyvinyl acetate solution in toluene.

DELHI

2. RED FORT, DELHI.—The chemical treatment of the marble work of the Bhadon pavilion was carried out with the chemicals like ammonia, triethanolamine and detergents for removing dust, dirt, smoke and greasy matter. The entire Diwan-i-Am, both externally and internally, was subjected to elaborate chemical treatment by using acetic acid, ammonia and teepol in order to remove the lime-wash and vegetational growth. Earlier the marble throne, canopy and the dias were chemically treated.

3. MAULANA JAMALI KAMALI'S TOMB, NEW DELHI.—The loose plasters bearing paintings were refixed to the ceiling using synthetic adhesives. All cavities were filled up and edges filleted.

4. NILA-GUMBAD, NIZAMUDDIN, NEW DELHI.—The paintings on the central dome was chemically treated in order to remove dust, dirt, soot and greasy matter deposited over them by the application of organic solvents such as benzene, pyridine, methyl alcohol and their mixtures. These were then preserved with the solution of polyvinyl acetate in toluene.

5. RAUSHANARA BARADARI, RAUSHANARA-BAGH, NEW DELHI.—The work of exposing the painted floral designs, covered under a coat of thick lime-wash and plaster, with the help of different solvents and scalpel is in progress.

HARYANA

6. IBRAHIM'S TOMB, NARNAUL, DISTRICT NARNAUL.—The exterior walls of the tomb covered with dust, dirt, moss and lichens were cleaned with soft nylon brushes and dilute ammonia solution.

[1]Information from: 27 M. N. Deshpande of the Nehru Centre, Bombay, 30 Department of Archaeology and Museums, Government of Rajasthan, and the rest Director (Science) of the Chemistry Branch of the Survey.

HIMACHAL PRADESH

7. LAKSHMINARAYANA TEMPLE, CHAMBA, DISTRICT CHAMBA.—The exterior walls of the temple, covered with lime-coat, moss and lichen, had been cleaned with diluted ascetic acid and dilute ammonia solution using soft nylon brushes.

8. HIDAMBA DEVI TEMPLE, MANALI, DISTRICT KULU.—The work of cleaning of the wood carvings and panels of the facade by using organic chemicals has been completed. The treated surfaces have been preserved' with polyvinyl acetate in toluene.

9. TABO MONASTERIES, TABO, DISTRICT LAHAUL SPITI.—The paintings on the walls of Chumlong and Chhamba Chibbo *gumphas* have been chemically treated with organic chemicals and preserved with polyvinyl acetate in toluene as these were covered with dust, dirt, smoke and oily substance. The cracks in the paintings have duly been filled in and all documentation works completed.

JAMMU AND KASHMIR

10. SUNCHEK MONASTERY, ALCHI, DISTRICT LEH.—The paintings were cleaned and preserved with organic chemicals and polyvinyl acetate in toluene. As there were many cracks in the paintings, the walls had to be first strengthened.

11. PATHAR-MASJID, SRINAGAR, DISTRICT SRINAGAR.—Moss, lichen and algal growth covering the exterior walls had been cleaned with soft nylon brushes and ammoniacal solution, followed by preservation of the treated area with 3 per cent coating of polyvinyl acetate in toluene.

12. SHEESH-MAHAL, RAMNAGAR, DISTRICT SRINAGAR.—The works of chemical treatment of the walls with organic chemicals and preservation with polyvinyl acetate solution in toluene have been completed.

KARNATAKA

13. TIPU SULTAN'S PALACE, BANGALORE, DISTRICT BANGALORE.—The superficial accretion of dust, dirt, soot and grease on the mural paintings of the Palace had been removed by means of chemicals like diacetone alcohol, morpholine, butyl lactate, acetone using turpentine as restrainer. Finally a preservative coating of 3 per cent polyvinyl acetate in toluene was applied.

14. CHENNAKESAVA TEMPLE, BELUR, DISTRICT HASSAN.—Thick growth of moss, lichen, dust, dirt etc., on the temple was removed by using 1-3 per cent aqueous ammonia solution mixed with little amount of non-ionic detergent like teepol. A fungicidal coating of 1 per cent zinc silicofluoride solution was provided followed by the application of a preservative coating of 3 per cent polyvinyl acetate solution in toluene.

15. DARIA DAULAT BAGH, SRIRANGAPATNA, DISTRICT MANDYA.—The work of consolida tion and fixing of the fragile and detached painted plaster of the paintings of the ceiling was carried out with the help of polyvinyl acetate solution. Insect nests and cobwebs were also removed. Finally a coating of 3 per cent polyvinyl acetate solution in toluene was applied as a preservative.

16. CHATURMUKHA TEMPLE, KARKALA, DISTRICT SOUTH KANARA.—The accretions on the roof of the temple due to the growth of moss and lichen were removed with the help of 3 per cent aqueous ammonia solution mixed with little amount of detergent like teepol. Afterwards the treated area was given a fungicidal coating of 3 per cent sodium pentachlorophenate followed by the application of a preservative coating with 3 per cent polyvinyl acetate solution in toluene.

17. GOMATESVARA STATUE, KARKALA, DISTRICT SOUTH KANARA.—The vegetational growth and oily deposits have been wiped out thoroughly by washing with 3 per cent aqueous ammonia solution mixed with little amount of non-ionic detergents like teepol and lissapol. A fungicidal coat of 3 per cent sodium pentachlorophenate was applied followed by acetate solution in toluene as a preservative.

KERALA

18. SANKARANARAYANA SHRINE, VADAKKUNATHA TEMPLE, TRICHUR.—The old preservative on the murals was removed by using toluene with cotton swabs and soft brushes. The soot, smoke and other accretions were removed by using triethanolamine, morpholine, cellosolve and butyl alcohol either in mixture or indivudually according to necessities with turpentine oil restrainer. The treated area was preserved with 2 per cent solution of polyvinyl acetate in toluene. The southern and the northern walls of the *nandi-mandapa* were also treated during the period.

MADHYA PRADESH

19. PATALESVARA TEMPLE, MALHAR, DISTRICT BILASPUR.—About five hundred loose sculptures kept in the precinct of this temple were chemically cleaned. After applying a coat of polyvinyl acetate as preservative, santobrite and zinc silicofluoride have been used as fungicides.

20. CHITRAGUPTA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—The plinth of the temple was chemically cleaned for the removal of moss, lichen and lime-wash. Finally the preservative coating of polyvinyl acetate in toluene-cum-acetone in the ratio 9:1 was used followed by the application of santobrite as fungicide.

21. BAGH CAVES, BAGH, DISTRICT DHAR.—The stripping of paintings from the eastern wall of Cave 4 and the eastern aisle was carried out systematically to save the murals from the impending danger of being affected by the seepage of water. The operation was done according to the Italian method and the pigment layer was lifted with slight adhesive of mud plaster. The stripped paintings had Ween packed by using the thermocol foam. An insecticide was also put inside the case. All these will ensure protection of the paintings from vibration and attack from micro-biological growth.

22. SHAH SUJA'S TOMB, BURHANPUR, DISTRICT KHANDWA.—Detached parts of wall paintings consisting mainly of floral designs in bright colours were properly set (pl. LIII) and the thick layer of dust, dirt etc., was chemically treated (pl. LIV).

23. CHAUBARADEVA TEMPLE, UN, DISTRICT KHARGON.—Moss and lichen, dust and dirt accumulated on sculptures were chemically treated, and broken pieces joined by epoxy resins. Santobrite as fungicide and polyvinyl acetate solution as a preservative have also been applied as protective measures.

24. NILKANTHESVARA TEMPLE, UDAIPUR, DISTRICT VIDISHA.—The chemical treatment of the interior and exterior of the temple has been undertaken. Lime-wash, dirt, dust, moss and lichen have been removed by using suitable mixture of chemicals while santobrite, and zinc silicofluoride are being applied as fungicides.

MAHARASHTRA

25. AJANTA CAVES, AJANTA, DISTRICT AURANGABAD.—The chemical treatment in different caves has been going on satisfactorily. Of all the caves, Cave 17 presents maximum complication on account of several coats of different types of varnishes applied on the murals from time to time. As the varnishes were in crude forms they had undergone aerial oxidation, thereby obliterating the actual theme and colour scheme. Added to the adverse effects of fluctuating temperature and relative humidity, other damaging factors had been the accumulation of dirt, dust, bat excreta, soot and so on. With the help of different types of organic chemicals and their mixtures the age old oxidized and brittle varnish having encrustations have been removed successfully. Panels chemically treated in the south aisle and south wall are: base portion of panel 1; *Ruru-Jataka;* half portion of panel 4; half portion of panel 5; middle and base portions of panel 9; and the base portion of panel 11 which was affected by chalkiness and the flaking of painted layer (now fixed properly). As a result of chemical treatment a pair of *sardula* on pillar 3 and beautiful dwarf *kinnara* figures on pillars 19 and 20 have come out nicely.

Experimental work according to the recommendations of the Expert Committee has been carried out in the east aisle and the east wall of Cave 16. The work of consolidation of loose painted plaster has been completed.

Consolidation of loose painted plaster etc., in Cave 10 was also carried out.

To overcome the insect activities in Caves 1, 2, 16 and 17 regular spraying of insecticide is being done in the cells; at times unpainted pillars are also subjected to spraying.

The work of removal of dust, dirt, soot, cobwebs etc. on the paintings has been going on regularly. Further, the recording of data concerning temperature and relative humidity in Caves 1, 2, 16 and 17 is in progress. Other experimental works which are being carried out are: determination of moisture contents in plaster and rock in the cells of Cave 1; analysis of mineral pigments occurring *in situ;* and to find out the limit at which the plaster starts shrinking and developing cracks.

26. KAILASA TEMPLE, ELLORA, DISTRICT AURANGABAD.—Consolidation, fixing, filletting of loose painted plaster in the *nandi-mandapa* were carried out.

27. BUDDHIST CAVES, THANALA, DISTRICT RAIGAD.—The remains of mural paintings, which were discovered in Cave 13 by M. N. Deshpande were chemically cleaned and conserved with the active cooperation of S. Subbaraman of the Survey. According to the latter's report the artists responsible for the paintings of Thanala caves, unlike those of Ajanta, used limited colours like red and yellow (in two shades), dark blue and white. While the red colour may be vermilion, the blue is difficult to adudge.

28. JAMESVARA TEMPLE, BHUBANESWAR, DISTRICT PURL—The chemical treatment of the remaining portion of the work was carried out with 2 per cent ammoniacal water in order to eradicate dried moss and lichen

29. JAGANNATHA TEMPLE, PURI, DISTRICT PURL—In continuation of last year's work *{1980-81,* p. 160), the areas of the subsidiary shrines to the south of the Lord Jagannatha temple were subjected to chemical cleaning for the removal of moss and lichen with 5 per cent ammoniacal water.

RAJASTHAN

30. GANESH POLE, AMBER PALACE, DISTRICT JAIPUR.—Paintings on the facade were consolidated and preserved. Oil paintings inside the *bhanjana-sala* have been restored partly.

UTTAR PRADESH

31. ITMAD-UD-DAULA, AGRA, DISTRICT AGRA.—Besides removing the dust and dirt, greasy accretions have been eradicated by using a mixture of methanol and solvent naptha (1:5). Marks of wax and insect activities were removed with the help of benzene and acetone with turpentine as a restrainer.

The white-plastered area having painted ornamental borders was treated with aqueous and alcoholic triethanolamine (1:5). Hard accretions were kept in contact with ethylene glycol in order to soften them, and once softened these were removed with swabs of cotton wool. Some dark hard patches were eliminated by using very dilute hydrogen peroxide applied with swabs of cotton wool soaked in methanol, whereas hard darkened accretions had been eliminated by using butyl acetate and butyl lactate. Moreover, oily spots were removed with the help of pyridine-morpholine serving as a restrainer. Thick coats of preservatives were removed by repeated application of toluene and methylated spirit in order to bring out the original beauty. The cleaned surface was finally preserved with 2 per cent polyvinyl acetate in toluene.

32. JAMA-MASJID, AGRA, DISTRICT AGRA.—Since this monument is situated in front of the Agra Fort Railway Station, smoky effects of the locomotives have posed serious problems. Smoke and soot have been eliminated by using triethanolamine in aqueous solution, dust and dirt from the marble surface by 2 per cent aqueous solution, deposits of burnt wax-candies by benzene, oily stains by applying 1:4 Dioxane, and tough deposits of dirt and dust by non-ionic detergent teepol in distilled water. Finally, a thin and very fine polish of manson was applied over the chemically treated marble surface.

33. SAHELI-BURJ, TAJ MAHAL, AGRA, DISTRICT AGRA.—The chemical treatment of this monument was conducted by the following measures: dust and dirt removed from the stone surface by scrubbing with nylon brushes and applying 1 to 2 per cent aqueous solution of ammonia; black moss and patches of lichen by ammoniacal solution added with aqueous and alcoholic triethanolamine; and general chemical treatment after paper-pulp treatment, where the salt efflorescences noticed. To check further growth of fungus and vegetation, zinc silicofluoride (5 per cent) in distilled water was sprayed on treated surfaces, which were preserved by polyvinyl acetate (1 per cent) in toluene when no moisture was left in the monument and the surface thoroughly dried.

WEST BENGAL

34. JOR-BANGLA TEMPLE, BISHNUPUR, DISTRICT BANKURA.—Accretions like moss and lichen on the temple were removed with the help of dilute alkaline solution of ammonia. Teepol was used in 1 to 3 per cent concentration for the removal of dust and dirt.

35. SHYAMRAI TEMPLE, BISHNUPUR, DISTRICT BANKURA.—Dilute alkaline solution of ammonia (1 to 2 per cent) was used for the removal of vegetational growth like moss and lichen. Suitable detergents like teepol were also used in dilute solution for the removal of dust, dirt and greasy accretions.

TREATMENT OF EXCAVATED OBJECTS AND MUSEUM EXHIBITS[1]

36. The chemical treatment and preservation of terracotta plaques and excavated objects from the monastic site of Vikramsila have been taken up. In order to remove accretions 1 to 3 per cent ammonia was used along with suitable detergents; soft nylon and coir brushes were used for cleaning the objects. In all, five hundred antiquities were cleaned.

37. Eighteen iron objects from Sringaverapura and forty-six from Ropar were chemically treated to remove all accretions deposited thereon.

38. Thirty-two copper objects and ninety-six coins from the Patiala Museum, ten from Punjab and forty-nine from Sringaverapura were chemically treated.

39. Seven glass paintings and six paper paintings from Indore Museum were cleaned and preserved. Moreover, a few oil paintings of the Archaeological Museum, Velha Goa were chemically treated.

40. Thirty-seven copper antiquities from the Archaeological Museum, Kondapur, fourteen lead and twenty-two copper coins and two pottery pieces from the South- eastern Circle of the Survey, and seventeen copper, thirty-eight iron antiquities and one lead coin from the Excava tions Branch I, Nagpur were chemically treated.

41. One stone sculpture of Lakshmi from the Regional Museum, Soneri Mahal, Aurangabad, was chemically cleaned.

42. Miniature paintings, photo-prints of Virgin Mary, Last Supper, Jesus Christ, and palm-leaf manuscripts were treated chemically. These apart, stone sculptures and ivory objects were preserved.

43. Four axes with dentation marks from the Chalcolithic site of Ganeshwar, three hundred and ten coins, twenty books, two miniature paintings, a broken plaque engraved with an Indian game Chaupar etc., were chemically treated. Out of the two metallic pots containing 414 kilogram of coins of Kasindra hoard in the Government Museum, Jodhpur, were counted after chemical and mechanical treatment. All the zoological specimens displayed in the gallery of the Central Museum, Jodhpur, were preserved with 10 per cent solution of formaldehyde. Five stone inscriptions and seven stone sculptures of the Government Museum, Ajmer were mended and restored.

[1]Chemical treatment carried out by: 36-39, Science Laboratory, Dehra Dun of Survey; 40, Regional Science laboratory, Hyderabad of Survey: 41, Western Zonal Science Laboratory, Aurangabad of the Survey; 42, Directorate of Archives, Archaeology and Museums, Goa; 43, Department of Archaeology and Museums, Rajasthan; and 44, Directorate of Archaeology, West Bengal.

44. The fungicidal treatment was repeated on the terracotta plaques and mouldings of the temples of Dewanji Siva and Chandranatha Siva at Hetampur as also the terracottas of the Sive temple at Ramnagar in District Birbhum. The fungal growth of moss and lichen on the decorative plaques of the Jami mosque at old Malda in District Malda were eliminated by dilute solution of ammonia and trithylamine, while the lime stains were removed by 2 per cent solution of acetic acid.

RESEARCH AND ANALYSIS

45. Seven samples from Khajuraho in different stages of weathering and deterioration were analysed fully for their ingredients and chemical composition. Physical parameters like porosity, PH specific gravity, compressive strength etc., were measured. By using instru ments like protimeter thermohygrograph the moisture content and relative humidity, temperature etc., were determined, besides tracing the source and origin of seepage and consequent cause of the stagnation of rain-water. The alteration in chemical constituents and physical parameters were correlated with the thickness and depth of deterioration during the period. Some fresh samples taken from querry are under analysis to investigate the composition etc., of the stones used in the construction of the temples at Khajuraho.

46. Two samples of mud plaster from the Tabo monastery were analysed quantitatively for determining the ingredients.

47. In order to protect the monuments of the Agra-Mathura region from the pollution effect of the Mathura refinery, thermal power plants and local foundries of Agra and other sources, the Archaeological Survey of India has set up an Anti-Air Pollution Laboratory at Agra to keep a watch on the state of health of stones, to adopt protective measures, install equipments to have a comprehensive picture of meteorological parameters, and to measure sulfation rate. The studies undertaken on the recommendations of a high-power committee appointed by the Government of India are based on the following considerations: analytical background of marble and sandstone; a general background of the industries located at Agra with a view to assessing the emissions/participations in pollution; gaseous pollutions e.g. SO^2, H^2S, oxide of nitrogen carbon and some others like PAN as well as sulfation rate to measure corrosiveness of the atmosphere; identification and analysis of particulate matter; analysis of rain-water; study of surface enrichment phenomenon by SEM, SEI, ESEI X-rays etc., collection of daily and monthly meteorological parameters—both primary and secondary; efficacy of different preservatives of different formulations under accelerated testing process on the samples; and general methods on technique of cleaning, consolidation and preservation. Some of the results of the investigations may be stated briefly. The chemical composition of the marble is as follows.—

		I	II	III
Loss of ignition		42.00%	39.20%	40.80%
Acid insoluble		0.82%	2.60%	1.00%
R_2O_3		5.40%	0.67%	0.67%
MGO		3.50%	1.43%	0.75%
Cao		47.30%	55.83%	56.23%
Alkalies		0.98%	-	-
		100.00	99.73	99.39
Density	—	2.33	2.37	2.47
Porosity	..	from 5 to 9% in volume		
Colour	..	white slightly dark		

The sulfation rate measured by the Survey's laboratory by lead-candle methods is as follows.—

	Taj	Sikandra
	(Unit—Mg/100 sq. cm/day (SO,)	
October-November 1981	0-5763318	1-6070236
January 1982	0-1103735	0-1138227
April-May 1982	0-0532728	0-0414346

The sulfation rate measured by NEERI according to pararosaniline method is as follows.—

November	99 Mg/m
January	80 Mg/m
May	36 Mg/m

After a thorough analysis of various preservatives like vinyl resins, acrylic resins, silanes, dynaglazes, polyconates, waxes etc., it has been found that the product BSM-40 along with the vinyl resins is the best.

48. R. V. Joshi and B. C. Deotare undertook phosphate analysis, both in the laboratory as well as field at the Chalcolithic site of Inamgaon to demarcate the extent of abandoned ancient settlements. As can be observed from the results given in the following table the phosphorus percentage decreases with the distance from the top of the mound. Since quantitative analysis is a time-consuming process a rapid chemical test as developed by Eidt was attempted. The known phosphorous content of a particular habitational deposit was examined on the spot. Samples of modern and sterile soils of known concentrations were also tested for comparison. By measuring the radiating lines and colour intensity in the laboratory this method was standardized. This qualitative and quick field test also proved to be very useful.

Particular	Phosphorus %
(i) Sample from top of mound towards west	0. 31
(ii) Sample 12m away from top	0.19
(iii) Sample 25m away from top	0.15
(iv) Sample 35m away from top	0.10
(v) Sample 45m away from top	0.08
(vi) Sample from top of mound towards east	0.30
(vii) Sample 12m away from top	0.18
(viii)Sample 25m away from top	0.12
(ix) Sample 32m away from top	0.06
(x) Sample 45m away from top	0.06

48. Analysis of the mineralization process of bones with special reference to flourine, phosphorous, organic carbon, carbonates etc, was undertaken by R. V. Joshi and A. A. Kshirsagar. A few bone samples from a deposit of 20,000 year BP from the Upper Pleistocene horizon were also examined. Some of the results obtained are tabulated below.

Inamgaon (Maharashtra)	%F	%P	%O.C.	%$CaCO_3$
* Jorwe—animal bone	0-035	12-51	0-29	20-16
* Malwa—animal bone	0-037	13-64	0-27	22-10
* Human bone (adult)	0-064	11-85	0-58	20-30
* Human bone (child)	0-029	12-23	0-57	15.10
20,000 years BP	0-983	7-68	0-08	48-70
Uncertain	0-781	6-58	0-11	55-45

Daimabad (Maharashtra)				
* Jorwe—animal bone	0.031	11.14	0.48	24.25
* Malwa—animal bone	0.043	12.37	0.44	22.54
Ramapuram (Andhra Pradesh)				
Chalcolithic animal bone	0.053	10.31	0.48	34.30
" " "	0.074	10.93	0.61	34.30
" " "	0.084	9.25	0.84	27.44
Devkachar (Madhya Pradesh)				
Upper Palaeolothic	1.259	10.31	0.28	37.60
Middle "	1.757	13.12	0.23	20.68
Lower "	1.805	9.75	0.16	42.30

Asterisks represent results expressed in mean values obtained from analysis of several samples, F—fluorine; P-phosphorus; O.C.—Organic carbon; and $Caco_3$—Carbonates.

XII ARCHAEOLOGICAL GARDEN[1]

ANDHRA PRADESH

1. HILL-TOP GARDEN, NAGARJUNAKONDA, DISTRICT GUNTUR.—The garden, divided into three enclosures, has now been taken up for intensifying the garden operations. The silt, which is brought by annual floods, is collected and extensively used for gardening works. Several lawns and flower beds have been laid out.

DELHI

2. KHAIRUL MANAZIL AND PURANA QILA, NEW DELHI.—Returfing of the lawns at Khairul Manazil and Purana Qila, started in the previous year, has been completed.

3. QUTB GARDEN, NEW DELHI.—Sprinkler system of irrigation has been successfully introduced in the sloping outer areas of Qutb complex.

JAMMU AND KASHMIR

4. SUN TEMPLE, MARTAND, DISTRICT ANANTNAG.—The land formations in the garden in various terraces are now planted with grass to act as ground-cover. Returfing of the area is under progress.

5. SANKARA-GAURISVARA TEMPLE, PATTAN, DISTRICT BARAMULLA.—It was proposed to introduce sprinkler system of irrigation for the better maintenance of the lawns in the garden. The work is in progress.

6. PATHAR MASJID, SRINAGAR, DISTRICT SRINAGAR.—Landscaping of the surroundings of the *masjid* is fast progressing.

KARNATAKA

7. VITTHALA TEMPLE-COMPLEX, HAMPI, DISTRICT BELLARY.—The development of the garden around this huge complex is in progress. Much of the preliminary operations required before undertaking the planting of ground cover as well as trees and shrubs are nearing completion.

8. GOL-GUMBAD, BIJAPUR, DISTRICT BIJAPUR.—The spacious garden around the Gol-gumbad is known for its lush lawns laid out in a formal fashion. Some of the pipe-lines laid out in the initial stages during the formation of the garden were very badly leaking and accordingly they have been partly replaced with P.V.C. pipe-lines. The work is in progress.

---

[1]Information from Chief Horticulturist of the Survey which maintains nearly 90 archaeological gardens. Important works carried out during the year under review are included here. Information on items 14 and 15 received from the Director, Archaeology and Museum, Government of Rajasthan.

9. GUMBAZ-E-SHAHI, GANJAM, DISTRIGT MANDYA.—The garden around this monument is purely formal and the ornamental portion is laid out abutting the monument, while the exterior peripheral portion is converted into an orchard. The lawns in the ornamental portion are being returfed.

MADHYA PRADESH

10. WESTERN GROUP OF TEMPLES, KHAJURAHO, DISTRICT CHHATARPUR.—The expansive lawns had outlived their normal life, so a phased programme was undertaken for returfing the ground cover. The work which started last year has since been completed.

ORISSA

11. MEGHESVARA TEMPLE, BHUBANESWAR, DISTRICT PURI.—The area around the temple has been taken up for landscaping. Immediate necessities like the motor pumping-sets and pipe-lines have since been procured.

12. SUN TEMPLE, KONARAK, DISTRICT PURI.—The area within the compound wall has been developed. A detailed landscape plan has been prepared for developing the vast sand-dunes around the compound wall of the temple. The work has started to carve out an appropriate movement pattern for the visitors to go round the area. Other works relating to planting of ground cover and suitable sacred plants from out of the indigenous flora are under examination.

13. JAGGANATHA TEMPLE, PURI, DISTRICT PURI.—There are two *upavanas* attached to this famous temple and in them plants are grown for providing flowers for the *puja* of the Lord Jagannatha every day. In order to supply large quantity of flowers continuously throughout the year, a submersible pump-set has been installed and a network of pipe-lines laid out to improve the water supply.

RAJASTHAN

14. CHAMAN-BAGICHI AND MANDORE GARDEN, BHARATPUR, DISTRICT BHARATPUR.—The Chaman bagichi and Mandore garden are being maintained in proper condition.

15. GARDEN, JAIPUR, DISTRICT JAIPUR.—The gardens in the palace-complex of Amber and Jateb Chowk as well as the gardens around Observatory are being maintained properly.

UTTAR PRADESH

16. RAM-BAGH, AGRA, DISTRICT AGRA.—The reorientation of the lay-out of the Rambagh on the Mughal style continues to be in progress. Initial works relating to earth cutting, formation of orchard plots etc., are in progress.

XIII. PUBLICATIONS

PUBLICATIONS OF THE SURVEY

1. INDIAN ARCHAEOLOGY—A REVIEW.—The issue for *1978-79* was published. While the one for *1979-80* is about to be released, the issue for *1980-81* is in the press.

2. EPIGRAPHIA INDICA.—Part VII of volume XXXVIII was printed. Parts I and II of volume XXXIX are in an advanced stage of printing. Part VII of volume XL has been sent to

Under the reprinting programme of the *Epigraphia Indica,* volumes VII, VIII, IX, XI, XII, XIII, XIV and XV were reprinted. Volumes XVI, XVII, XVIII, XIX and XX have been sent to the press. *Appendix to Epigraphia Indica Volumes* XIX-XXIII, popularly known as Bhandarkar's list, will be reprinted shortly.

3. EPIGRAPHIA INDICA-ARABIC AND PERSIAN SUPPLEMENT.—The issue for *1974* was published and the one for *1975* is in the press.

4. ANNUAL REPORT ON INDIAN EPIGRAPHY.—While the issue for *1971-72* was published, the issue for *1972-73* is in an advanced stage of printing.

5. SOUTU INDIAN INSCRIPTIONS.—Volume XXIV of the series has been published. Volumes XXII, XXV and XXVI are in different stages of printing.

6. MEMOIRS OF THE ARCHAEOLOGICAL SURVEY OF INDIA.—Volume I of *Ratnagiri (1958-61)* by Debala Mitra was brought out as Memoir no. 80. Its second volume is in the press. *Karandai Plates o/Rajendra Chola* (Memoir no. 79) by K. G. Krishnan is expected to be out shortly. *Images of Nepal* by Krishna Deva has been sent to the press.

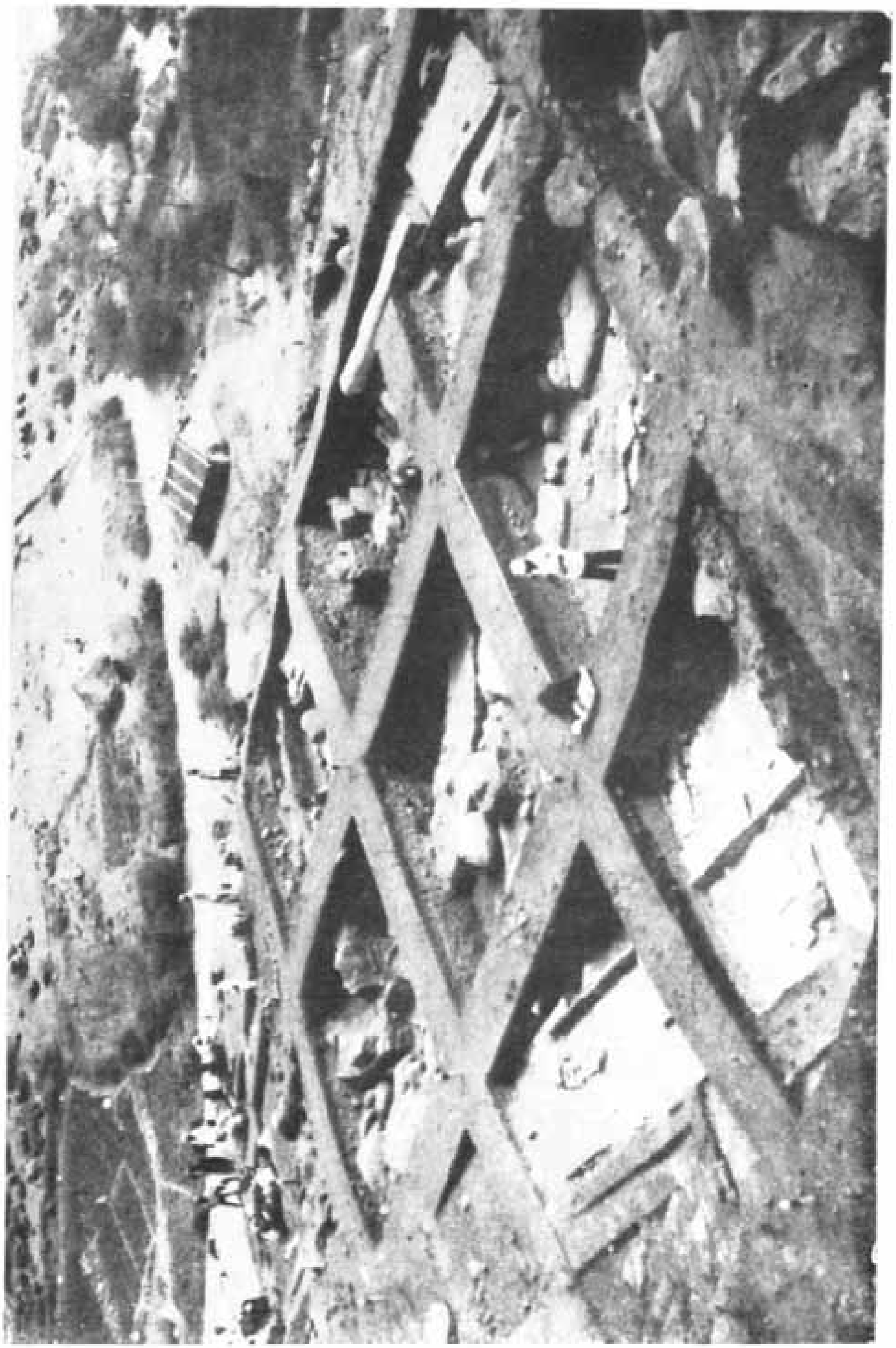
7. GUIDE BOOKS.—*Archaeological Museum, Sanchi* (second edition) by Narinder Nath and J. P. Saxena, *Delhi and its Neighbourhood* (reprint) by Y. D. Sharma, *Dig* (third edition) by M. G. Joshi, *Kusinagara* (second edition) by D. R. Patil, *Mandu* (reprint) by D. R. Patil, *Mandu* (Hindi version) translated by Ravinder Narang, *Sarnath* (Hindi, second edition) by V. S. Agrawala, *Sravasti* (second edition) by M. Venkataramayya, *Taj Museum* by Z. A. Desai and H. K. Kaul has been sent to the press.

8. CONSERVATION MANUAL.—The Hindi version of the Manual, entitled *Samrakshan Niyam-pustika,* has been published.

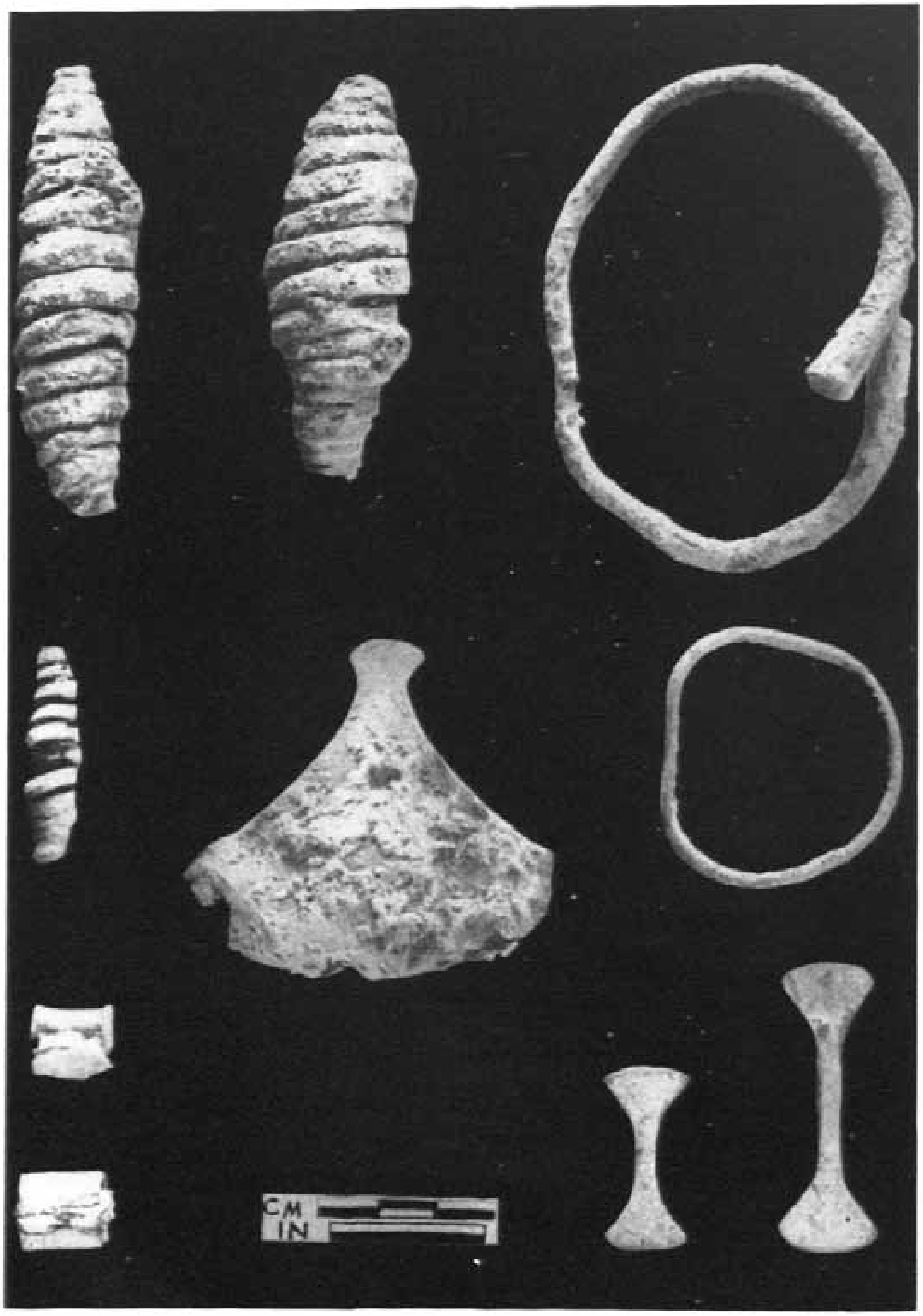
9. PICTURE POSTCARDS.—Coloured picture postcards on Khajuraho, Konarak and Bhubaneswar as well as black and white picture postcards on Konarak and Mahabalipuram were brought out.

OTHER PUBLICATIONS

HIMACHAL PRADESH.—The Department of Languages and Culture, Government of Himachal Pradesh, reprinted the *History of Punjab Hill States]* volumes I and II, by J. Hutchison and J. Ph. Vogel.



Vaddamanu : General view of the excavated site showing the stupa and vihara. *See p. 1*



Ramapuram : copper objects. *See p. 3*



A

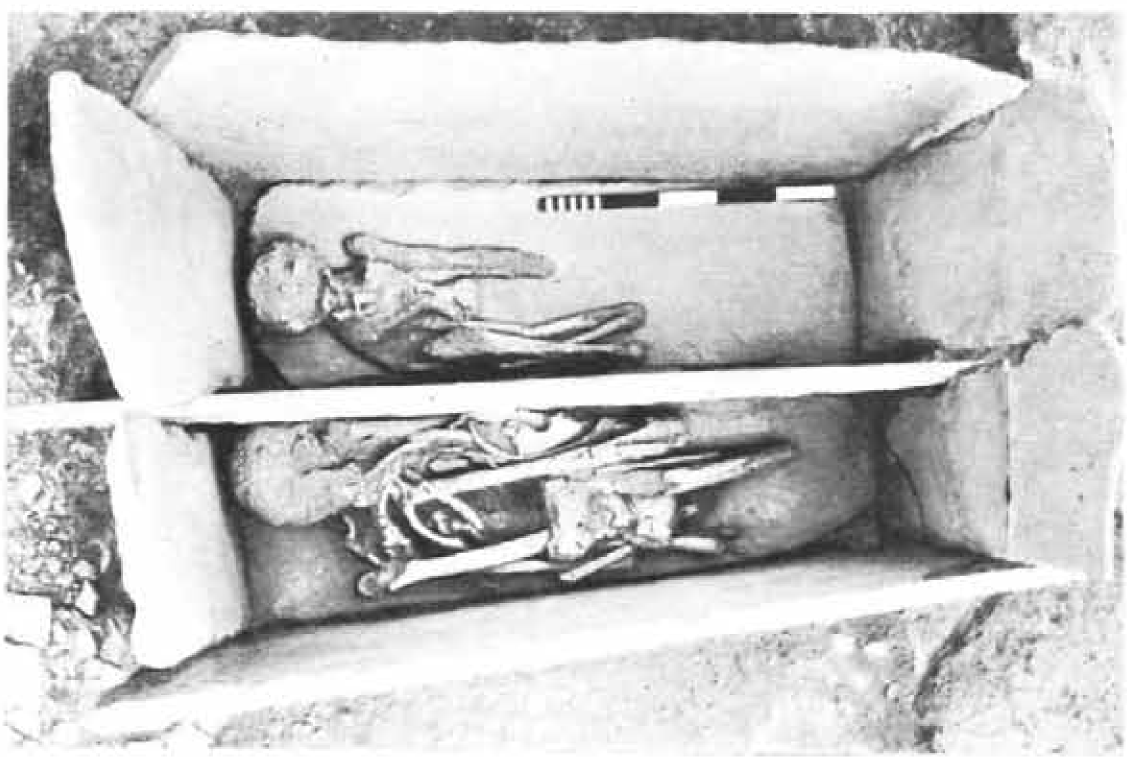


B

Ramapuram : A, *child burial, Period IB* ; B, *skeletal remains of a goat and burial goods.* *See p.* 6

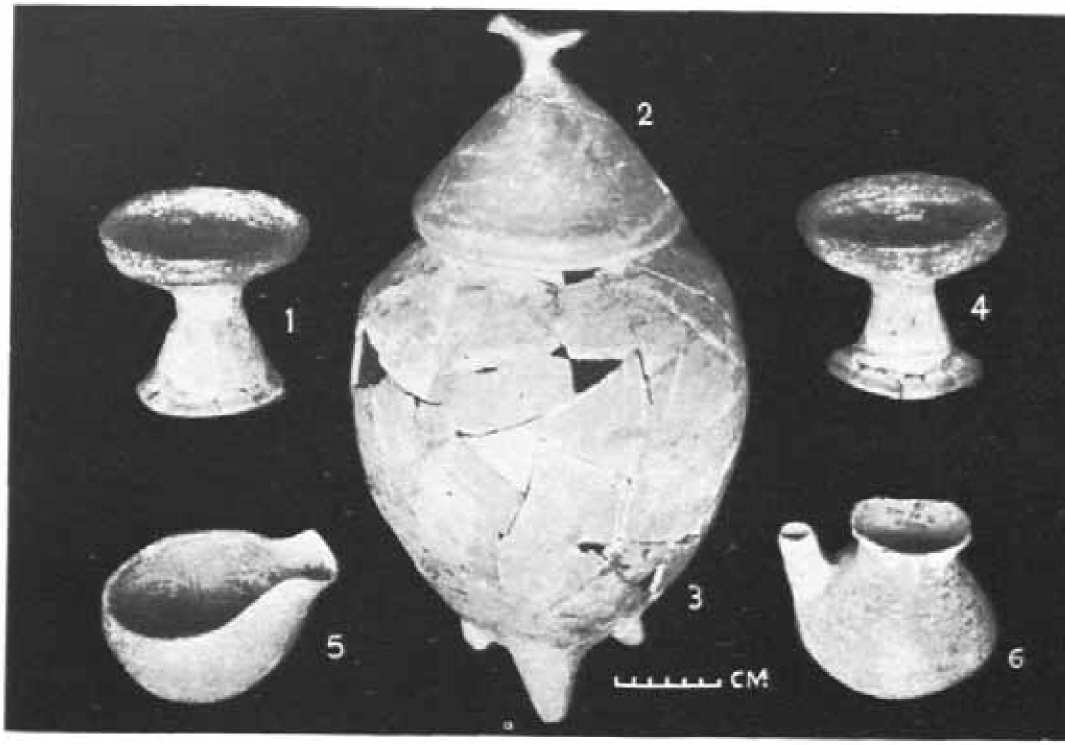


A



B

Ramapuram : A, *view of transepted cist*; B, *view of twin cist*. *See p. 6*

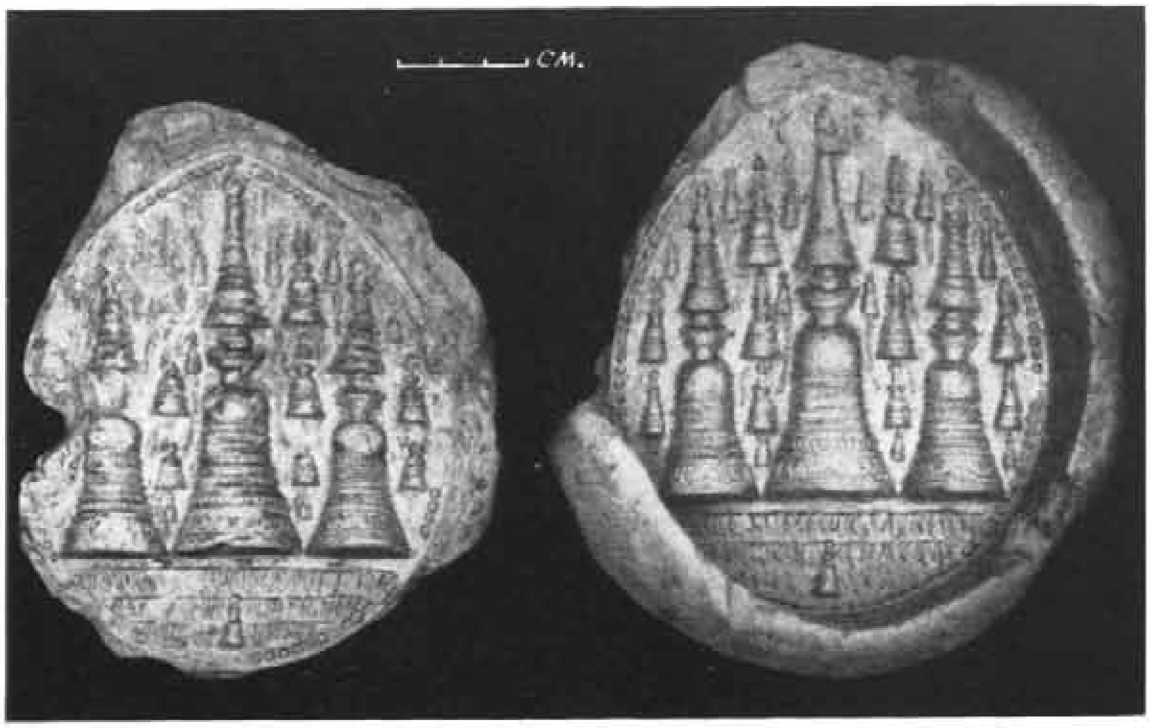


A



B

Ramapuram : A, *burial pottery*; B, *Megalith I, general view.* *See p. 6*



A





B C

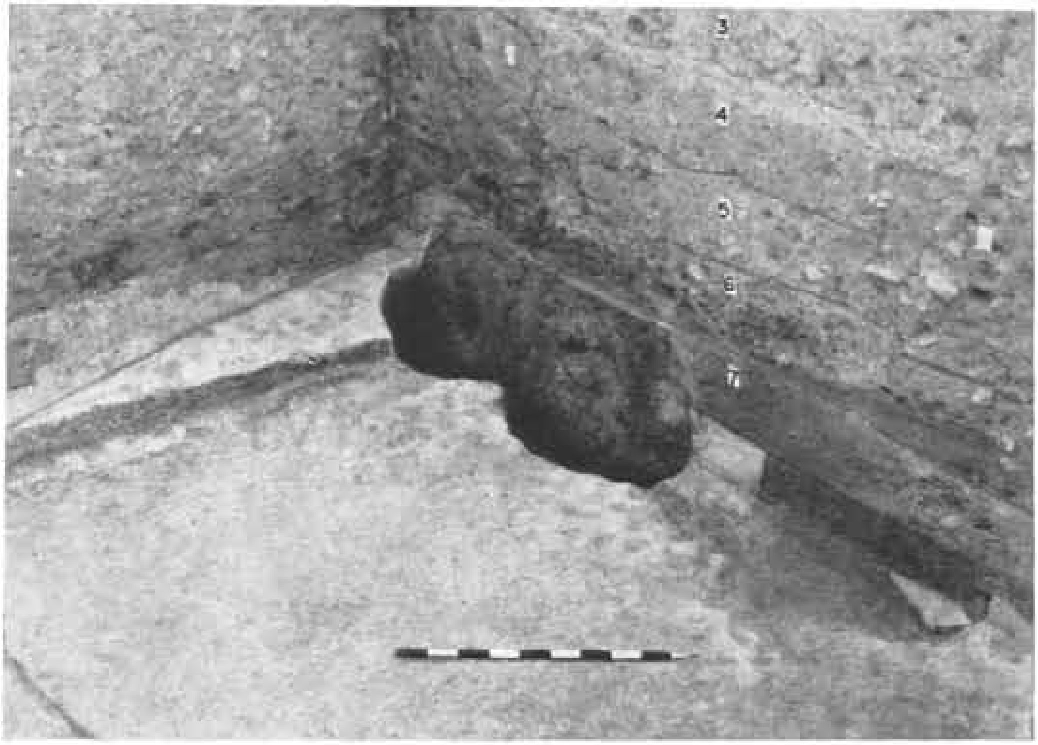
A, *Antichak : terracotta plaques*; *Taradih*; B, *terracotta sealing (cast)*; C, *seated Buddha*. *See pp. 10, 11 and 12*



Nalanda : Sarai Mound, Vagesvari. See p. 12



Gufkral : storage pits, hearths and floor levels, Period IA. *See p. 19*

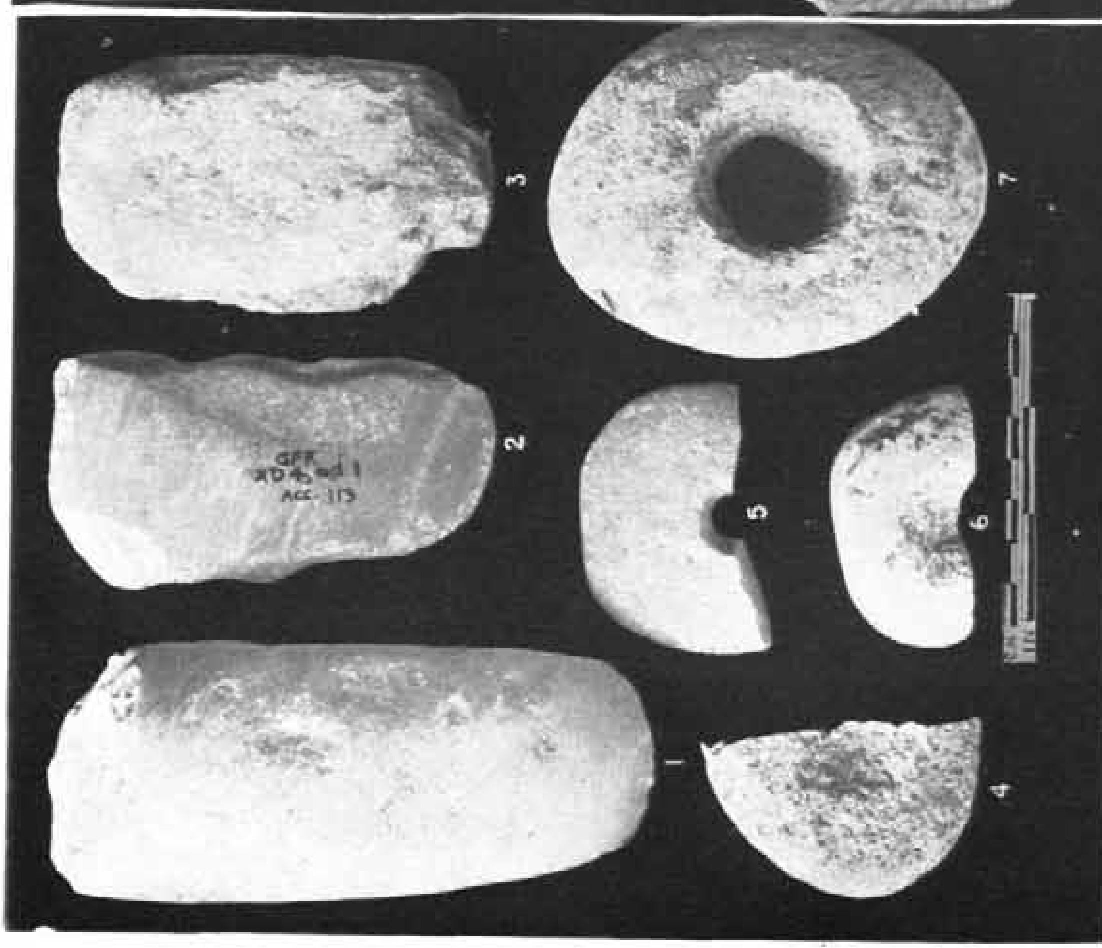


A

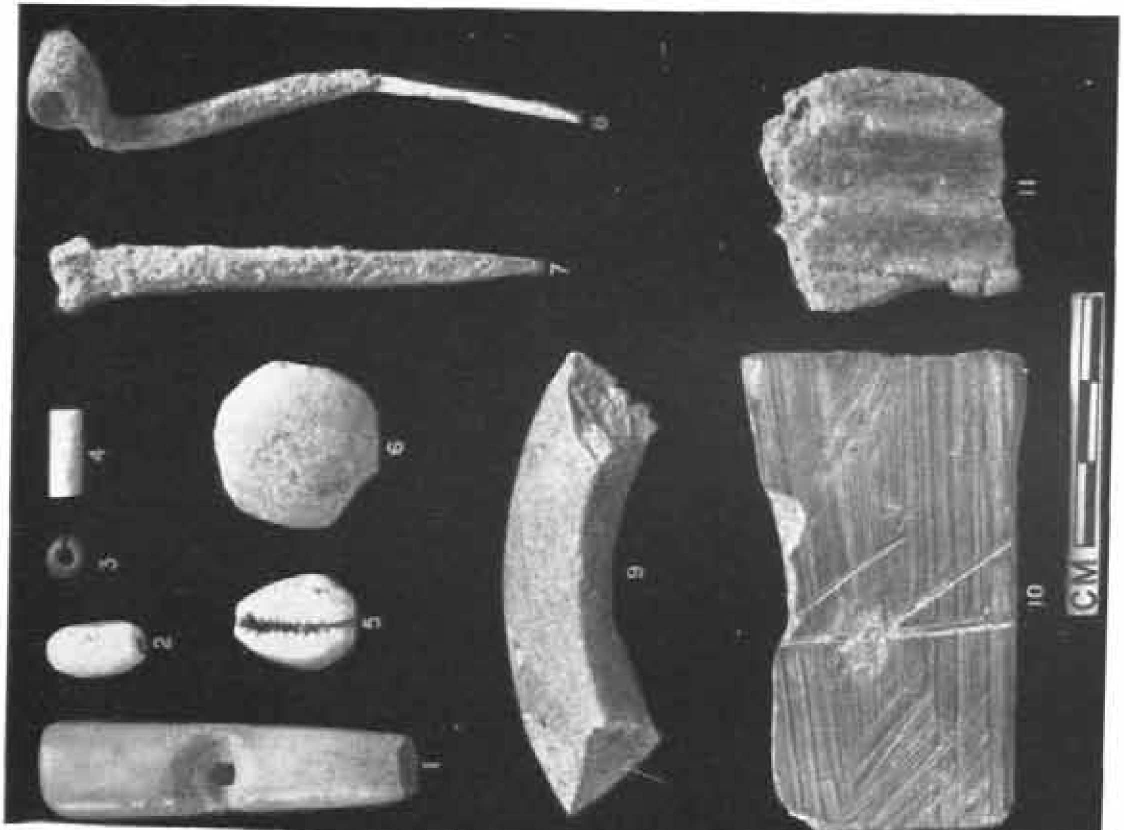


B

Gufkral : A, *dwelling and storage pits and floor*; B, *mud and rubble wall, Period IB.* *See pp.* 20 *and* 23

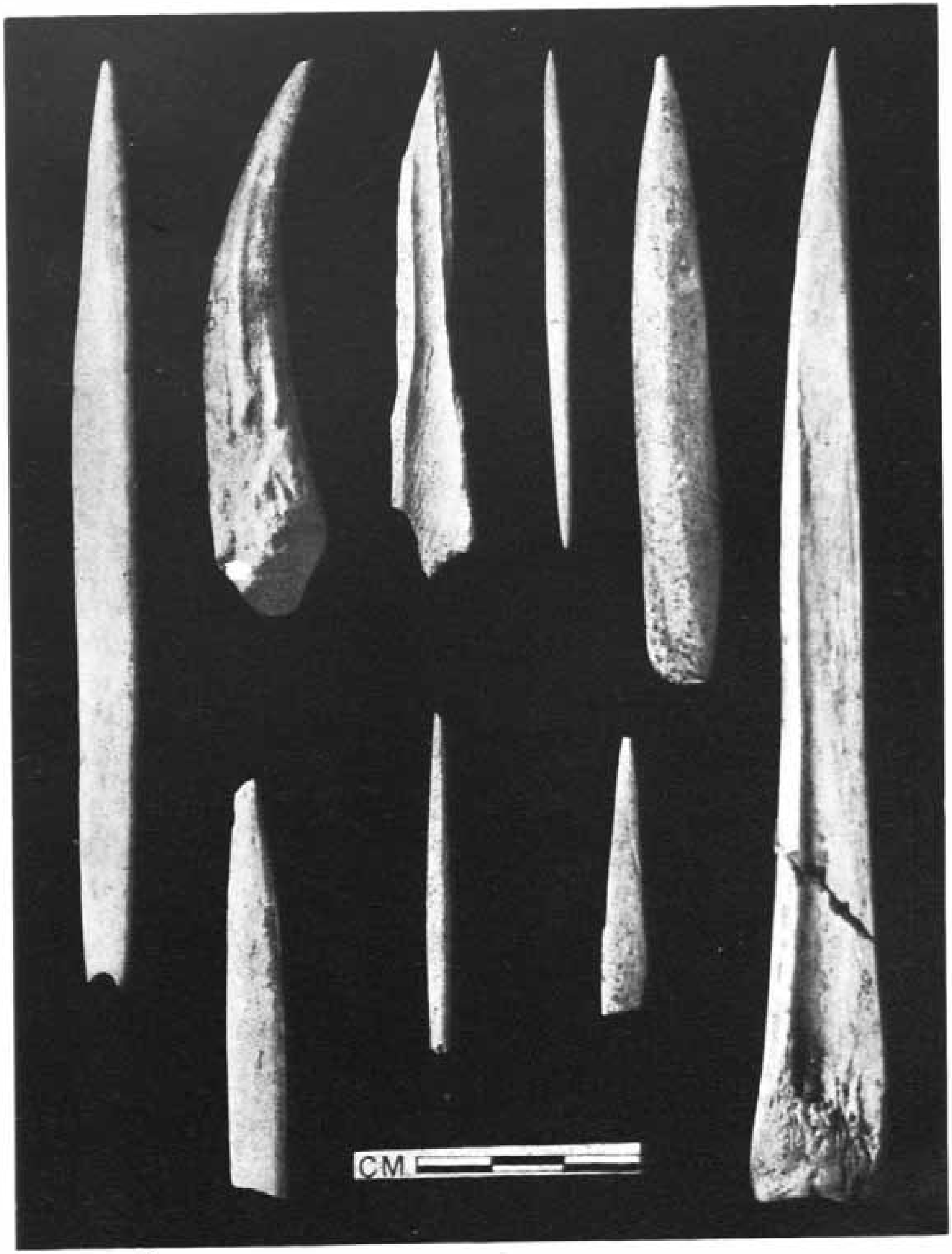


A

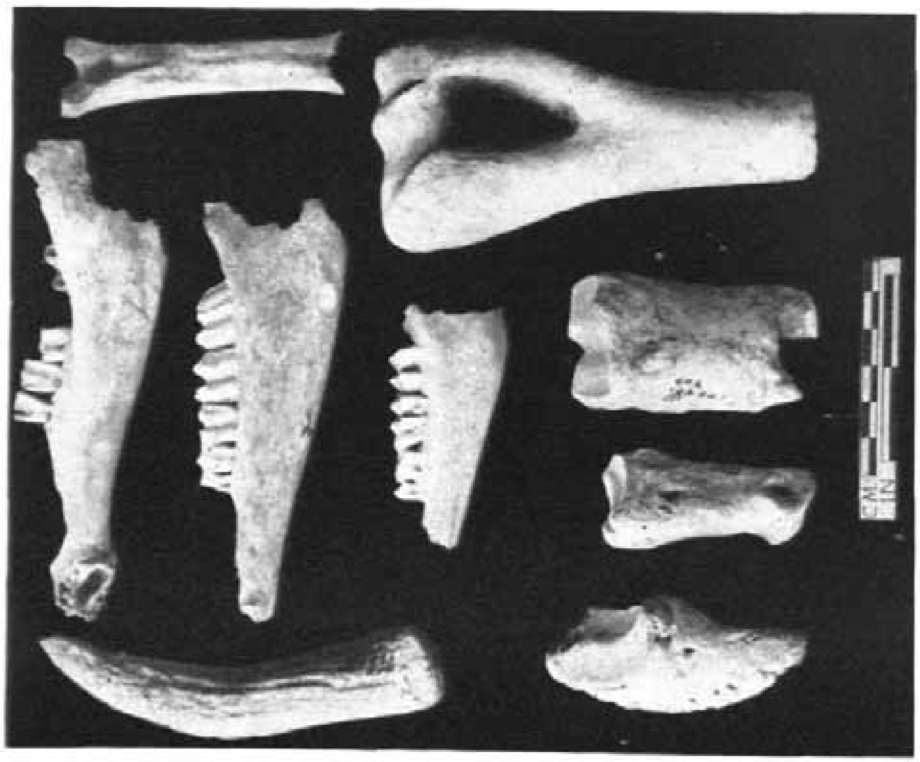


B

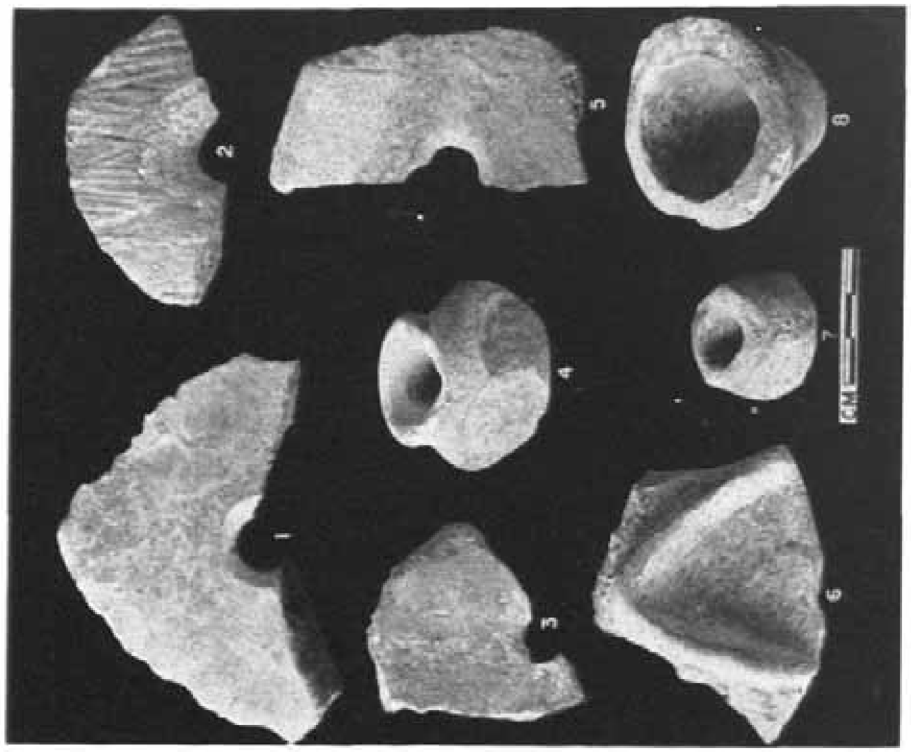
Gufkral : A, stone celts and ring-stones, Period IA and II; B, minor antiquities, Period IA, IC and II. See pp. 20, 23 and 25



Gufkral : bone tools, Period I A. *See p. 20*

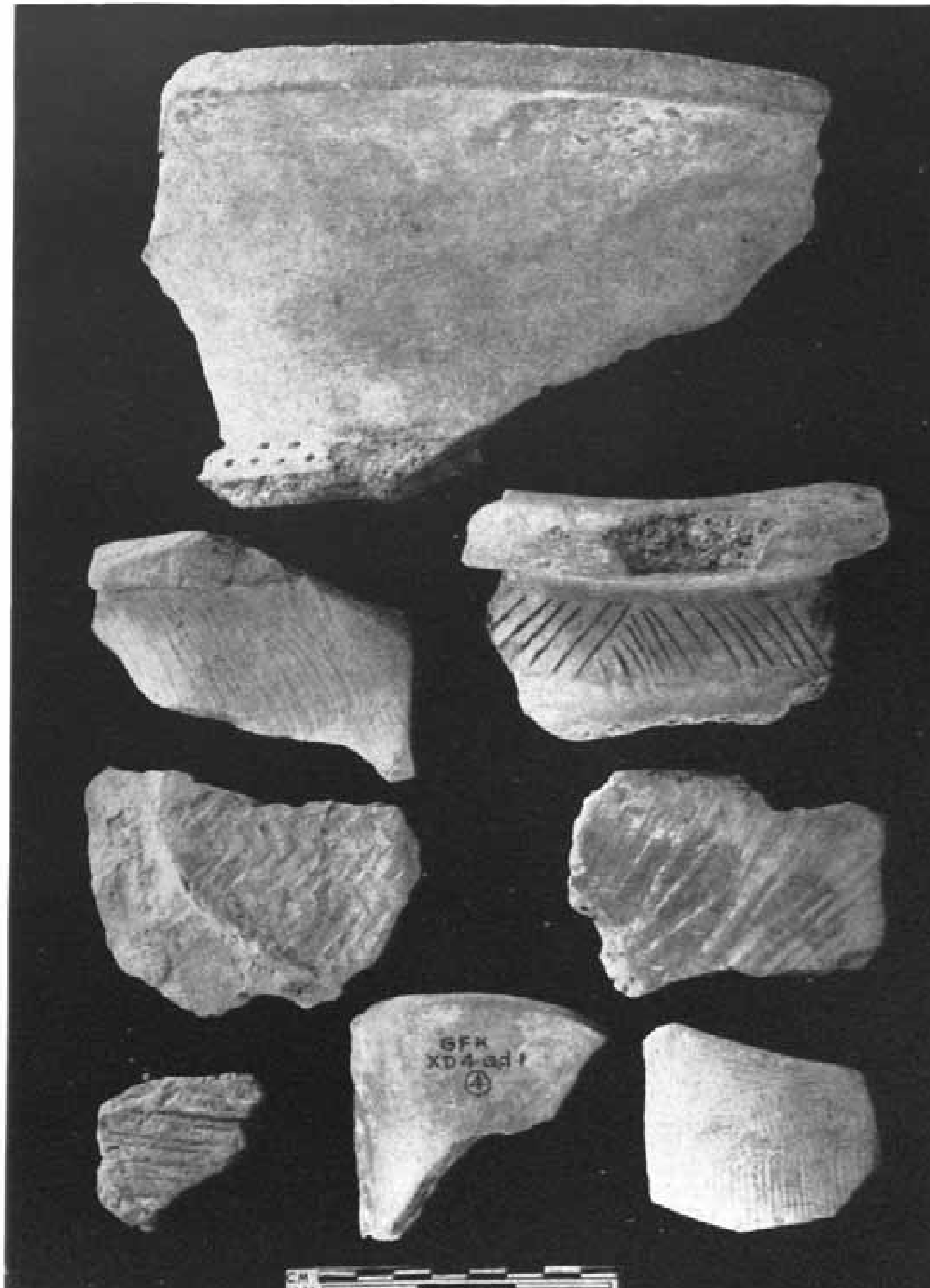


A

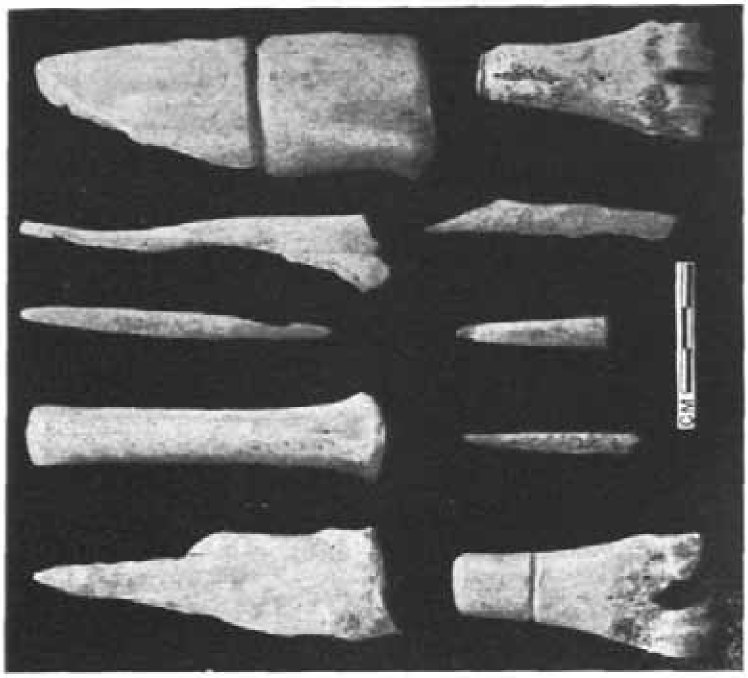


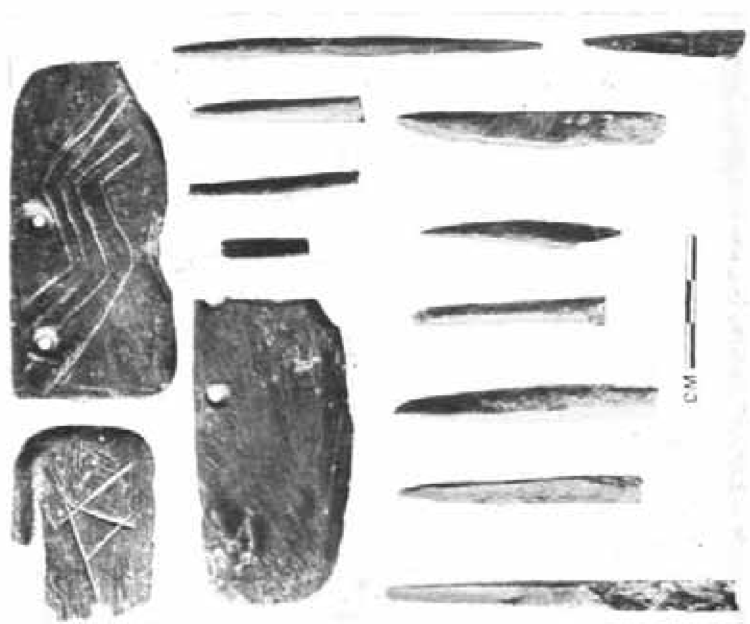
B

Gufkral : A, animal bones, Period IA; B, spindle whorls and miniature pots, Periods IC, II and III. See pp. 20, 23 and 25



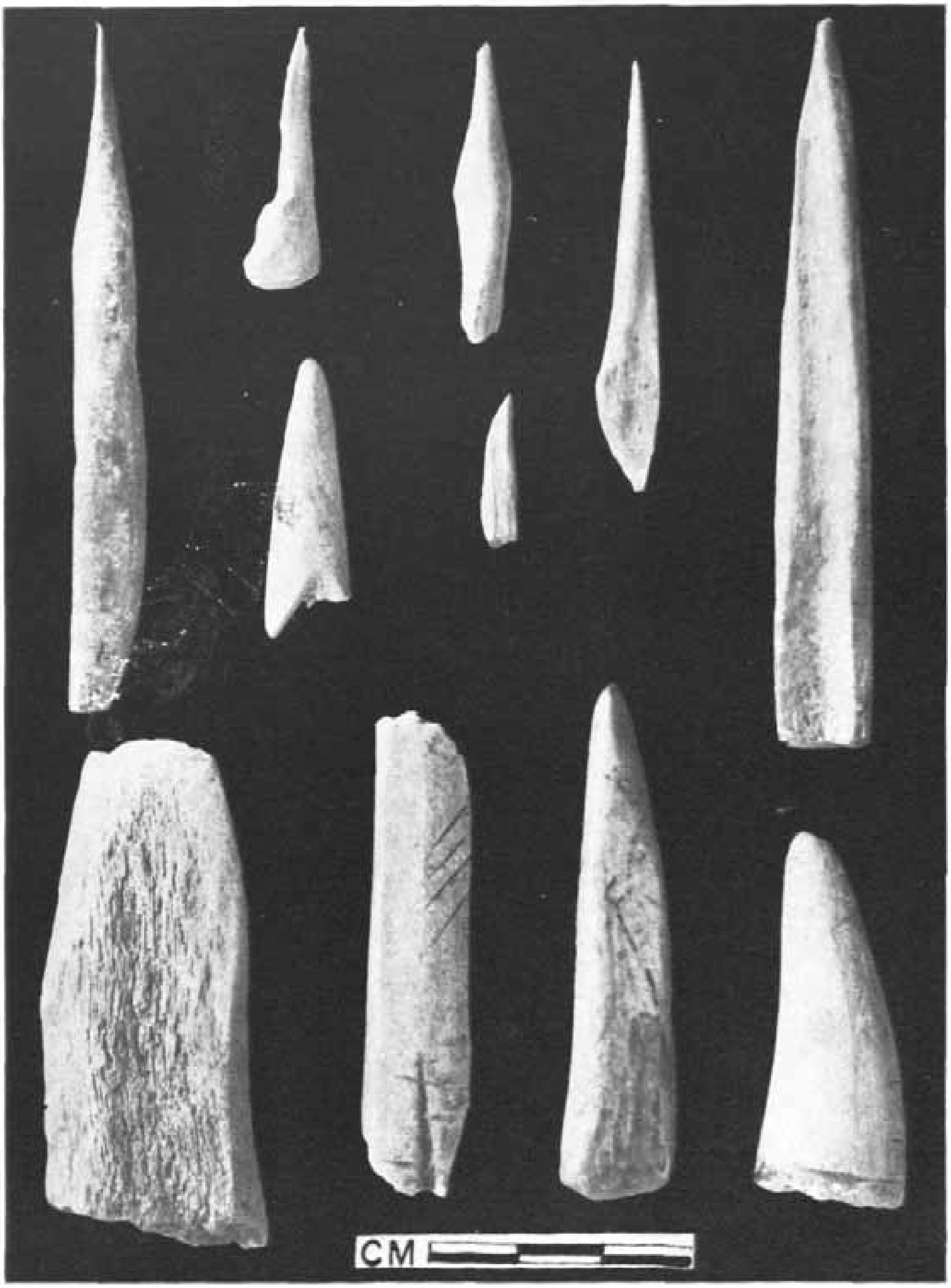
Gufkral : decorated neolithic pottery, Period IC. *See p. 23*



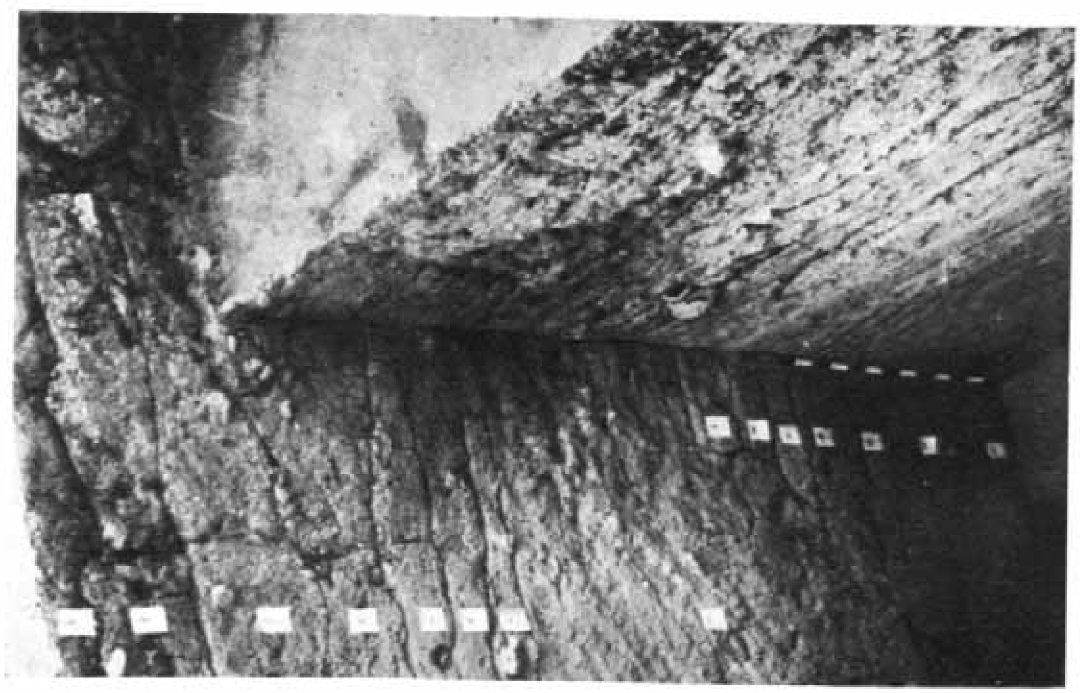


A B

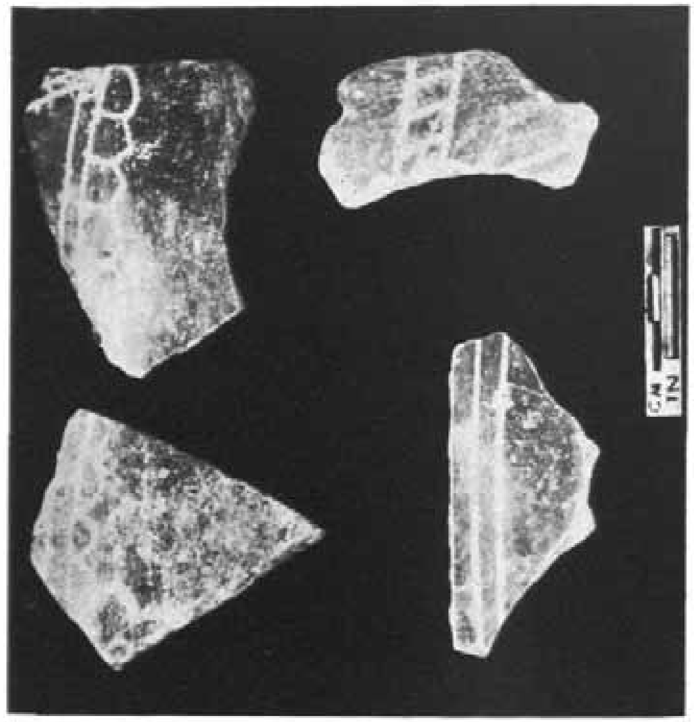
Gufkral : A, *harvester and bone points, Period IC.* B, *bone tools, Period II.* *See pp. 23 and 25*



Gufkral : bone tools, Period IC. *See p. 23*



A



B

Gilaulikhera : A, *exposed section*; B, *chocolate-slipped ware*. *See pp. 33 and 34*

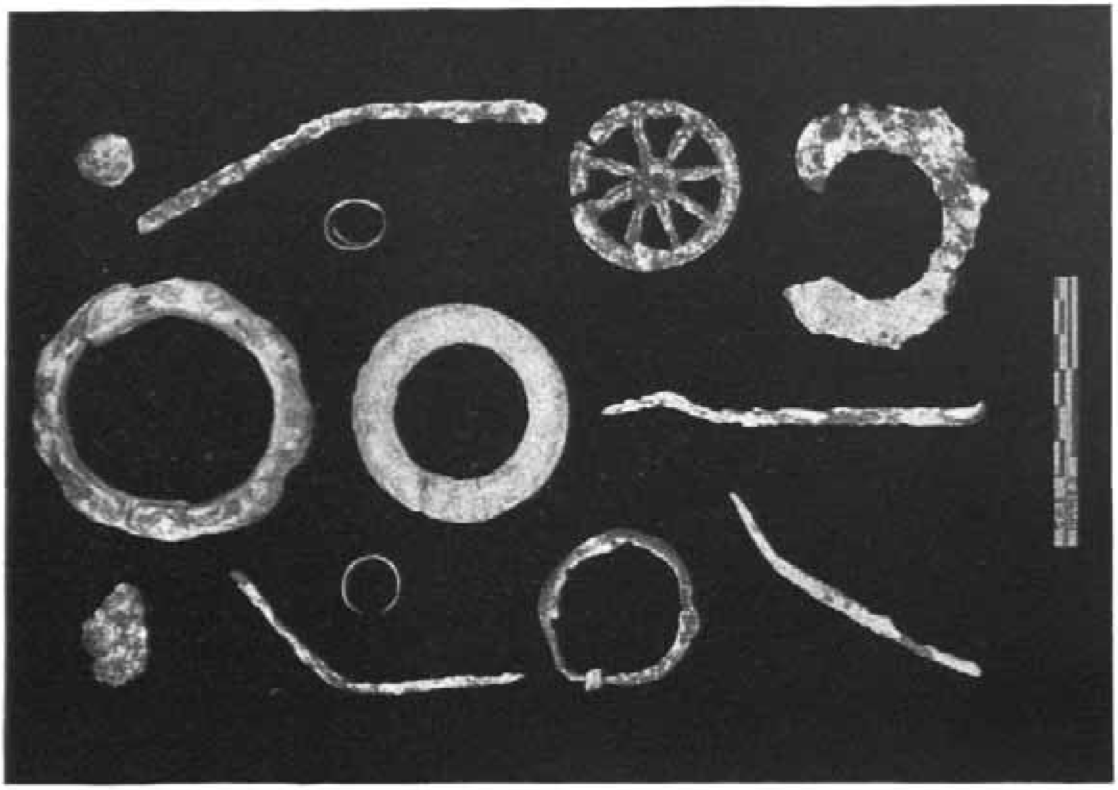


A



B

A, Quilon : stone tools ; B, *Nandur : burnt brick structures. See pp. 29 and 37*



B

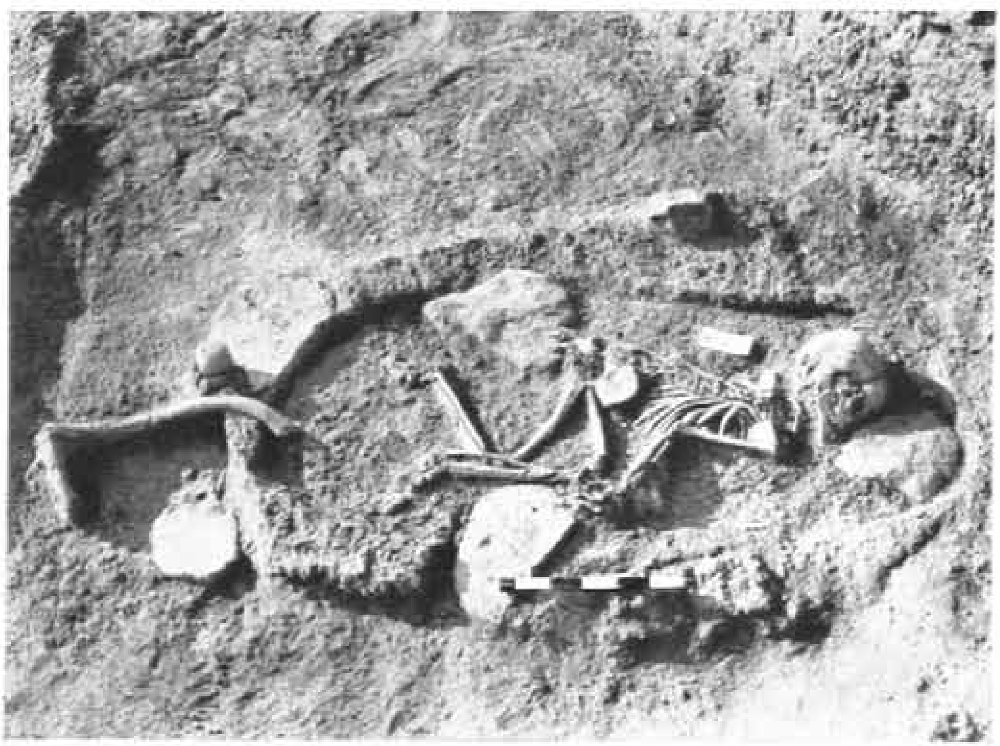


A

Nandur : A, sealings; B, copper objects. See p. 37

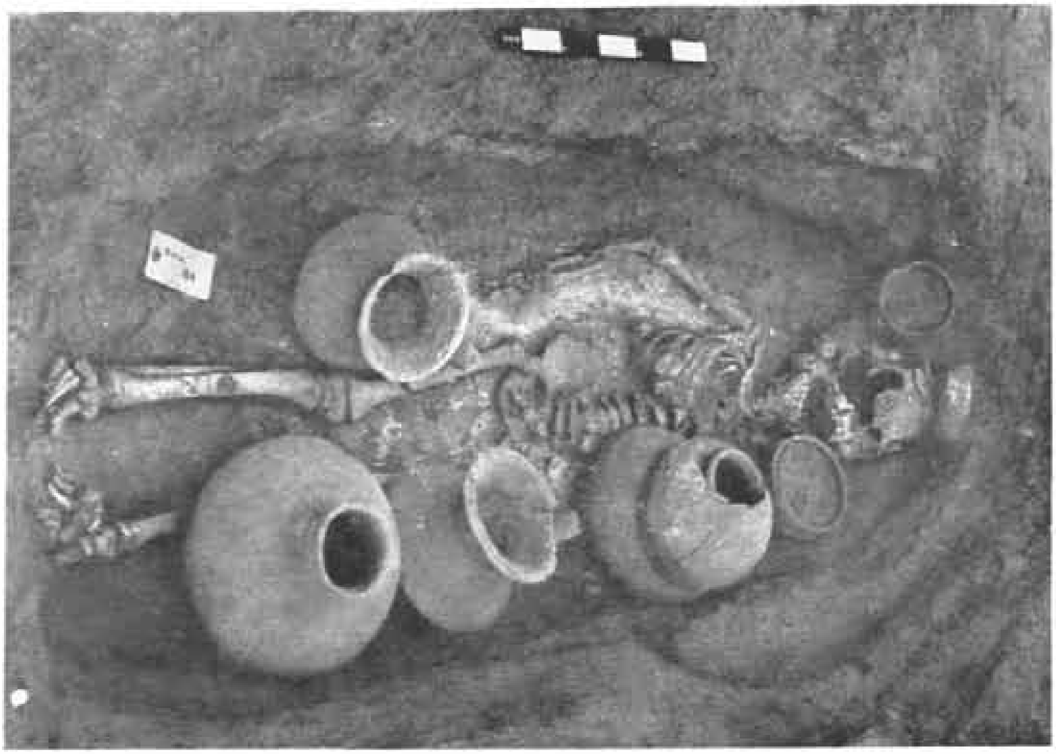


A

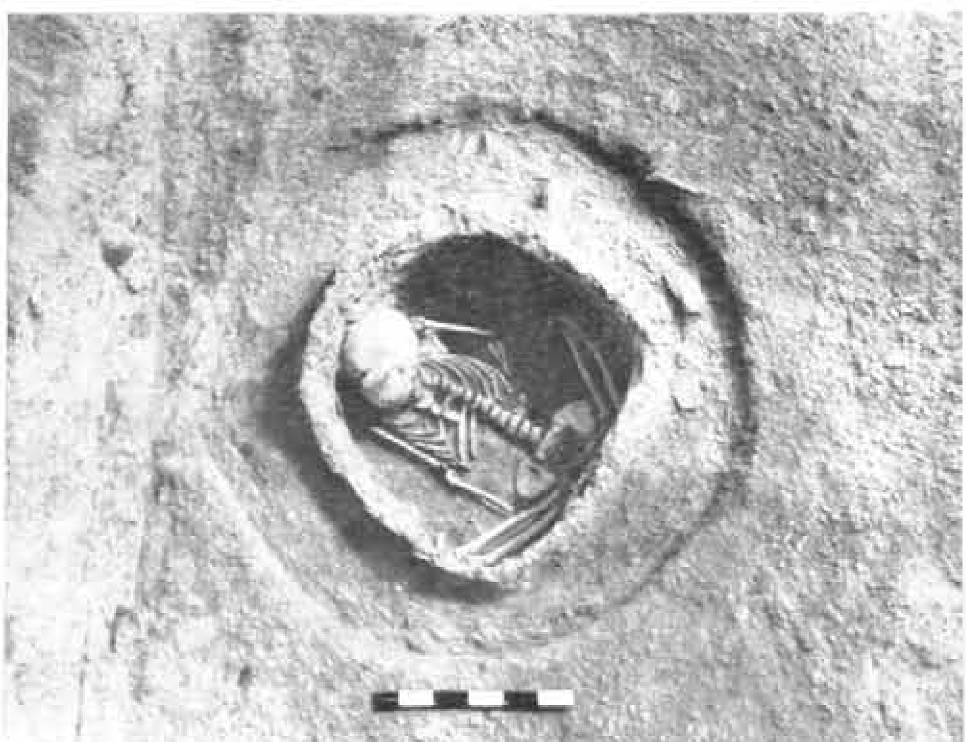


B

Inamgaon : A, *plan of a house, Period II*; B, *burial, Period III*. *See p. 50*



A



B

Inamgaon : A, *burial with skeletal remains*; B, *burial*, *Period II*. *See p. 51*

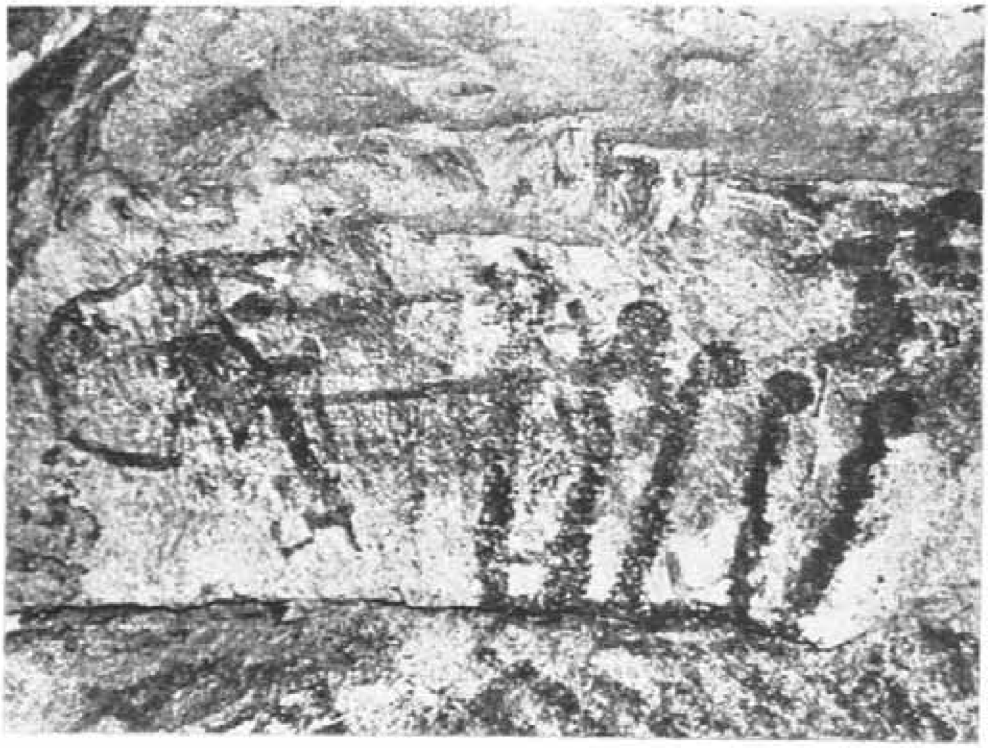


A



B

A, *Khairwada* : *stone circle*; B, *Kishan Bilas* : *rock-shelter*. *See pp.* 52 *and* 56

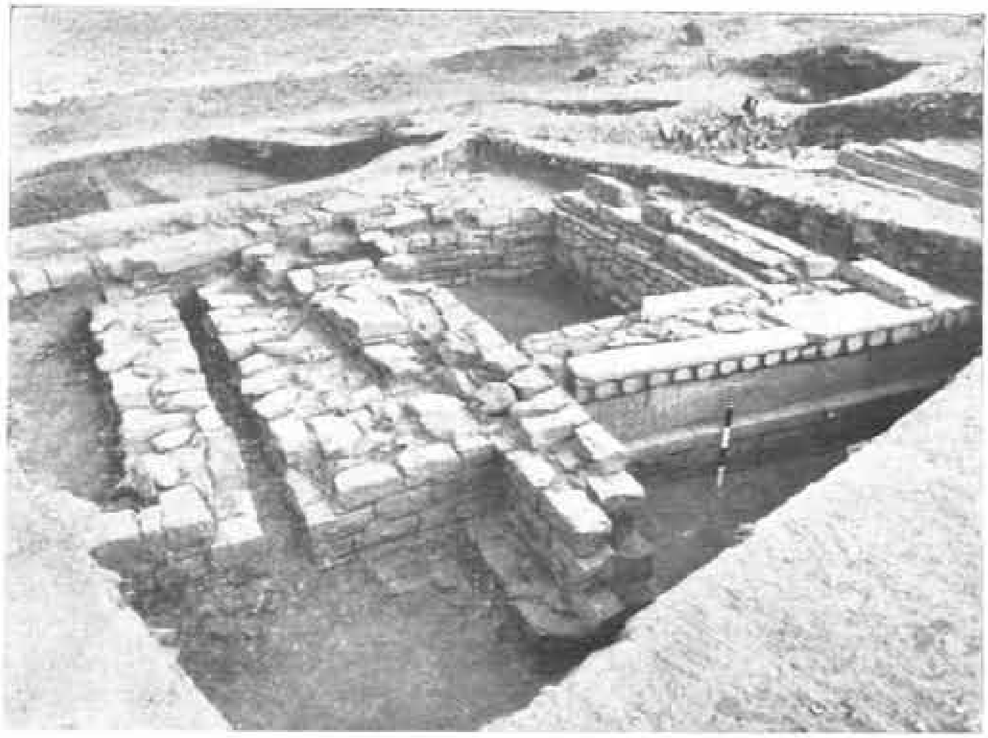


A



B

Kishan Bilas : A *and* B, *paintings in rock-shelters.* *See. p. 56*



A



B

Fatehpur Sikri : A *and* B, *excavated structures.* *See p. 65*



A



B

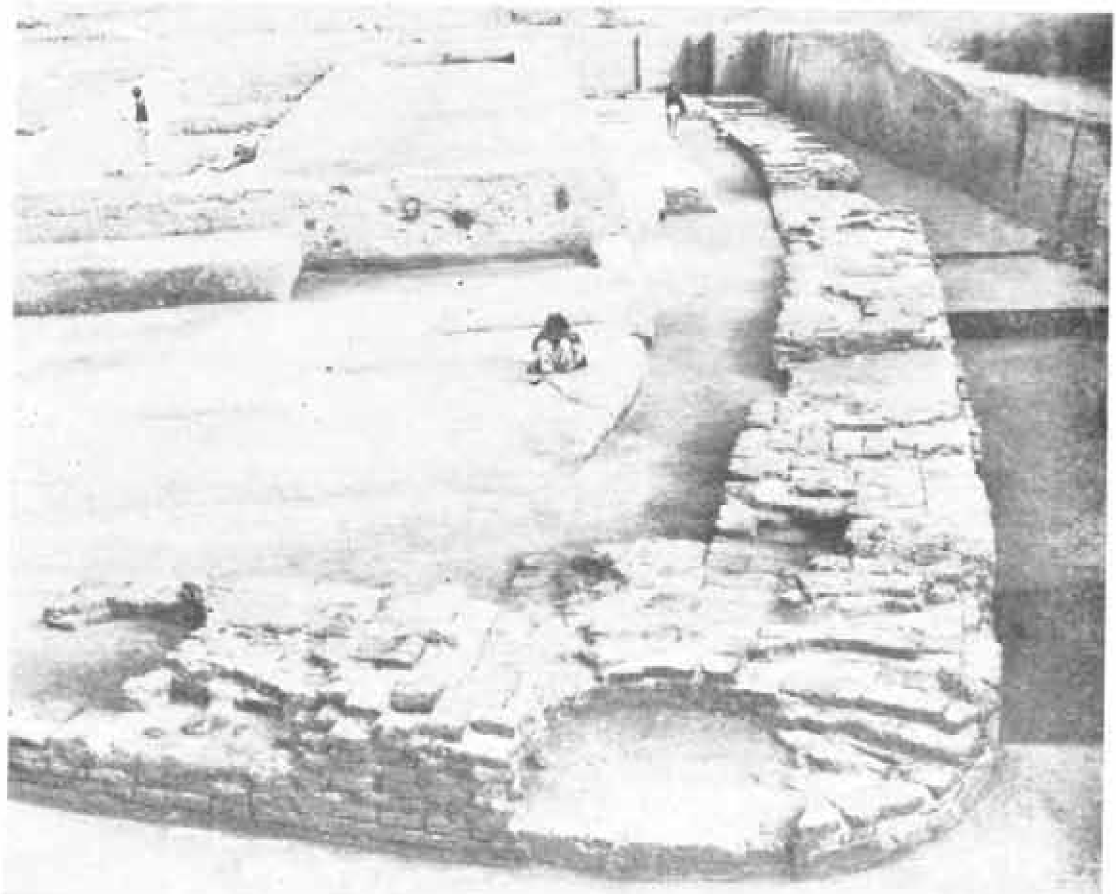


C

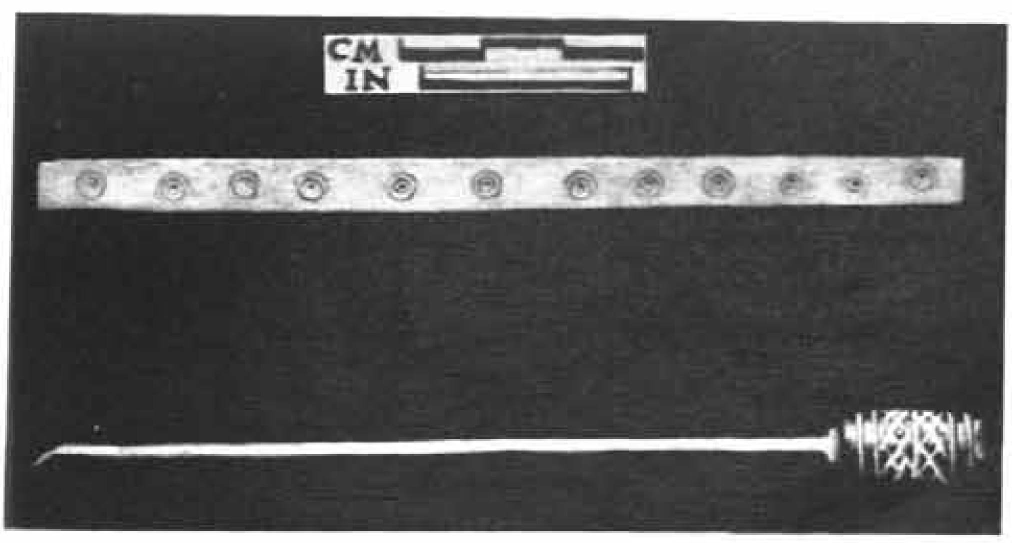


D

Sringaverapur : A, *teracotta seal and impression*; B, *terracotta mould and impression*; C, *terracotta human figurines*; D, *terracotta tablets*. *See p. 67*



A



B

Hulas : A, *burnt brick structure*; B, *bone pin and ivory scale*, *Period II and V* *See p. 74*



A



D



C

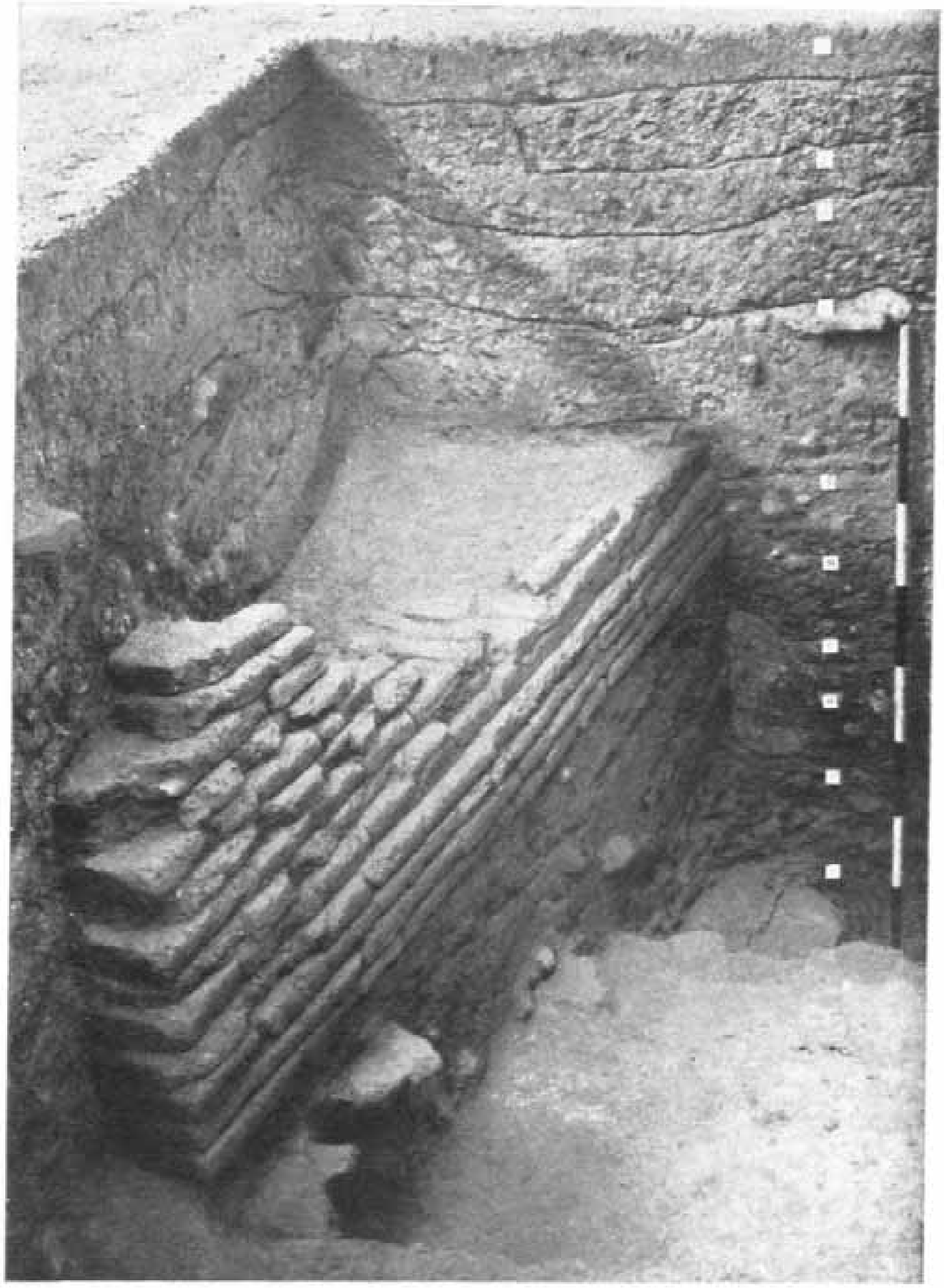


B

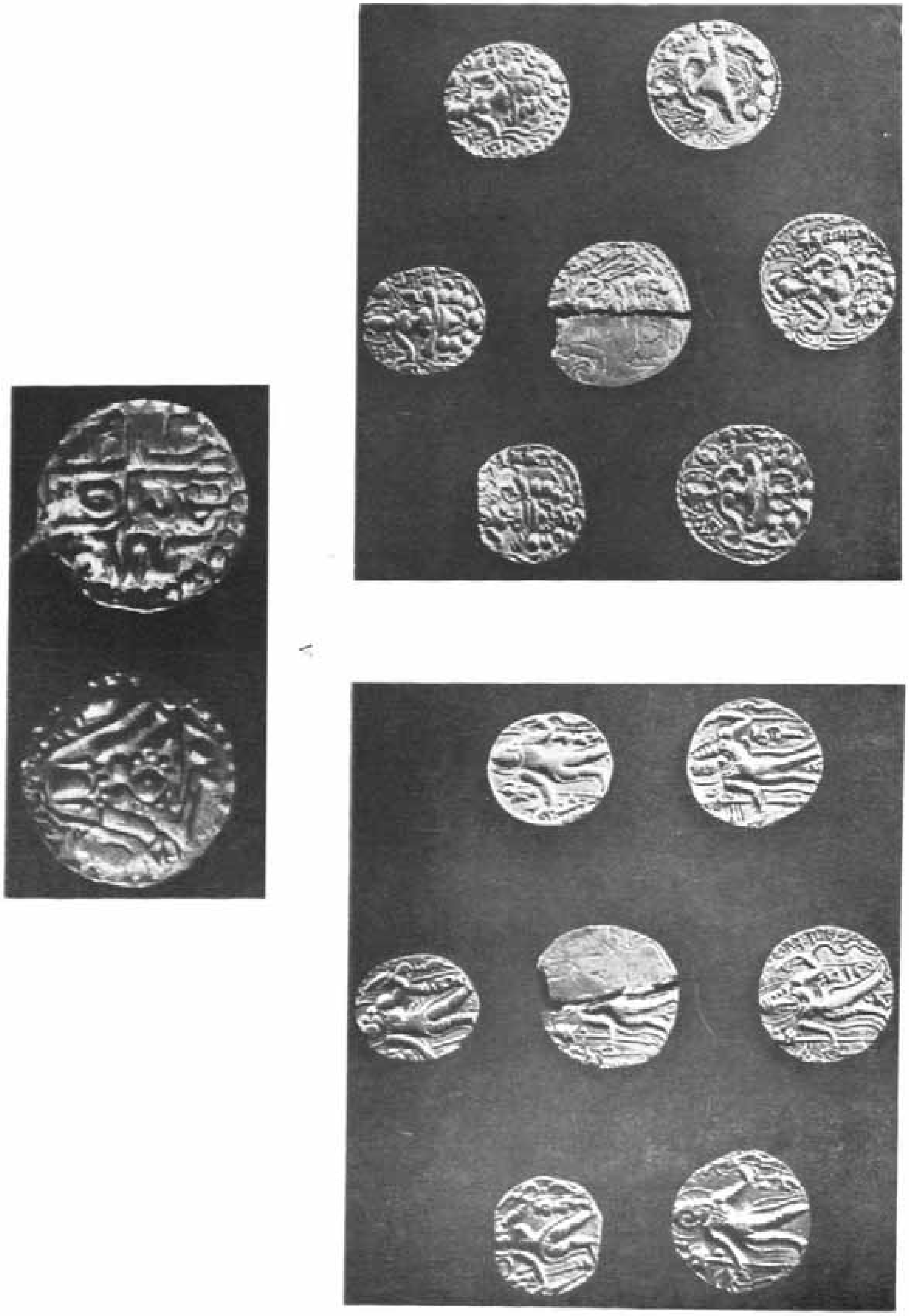


E

Vairat : A *and* E, *terracotta human heads*; *Rajbadidanga* : B *and* C, *terracotta seals*; *Hulas* : D, *terracotta sealings of Kushan Period.* *See p. 71, 75 and 74*



Rajbadidanga : brick structure. *See p. 75*



A

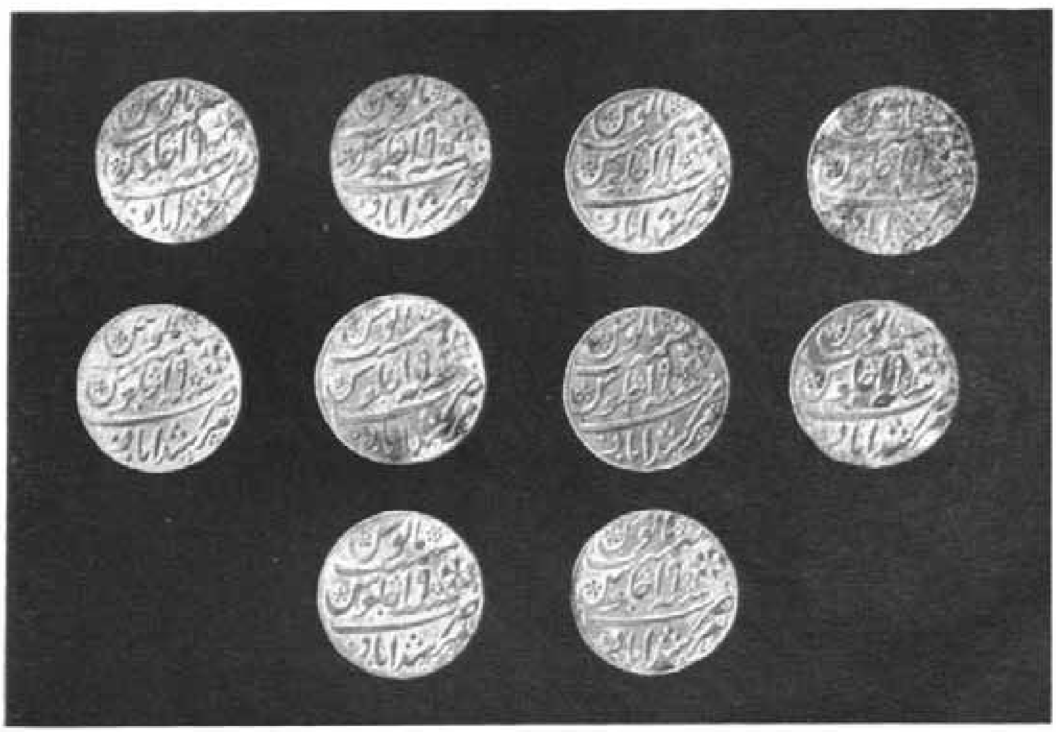
B

C

Peepalia Nagar : A, *Gold coin*; *Bnimchegram* : *Gupta gold coins*; B, *obverse*, C, *reverse*. *See pp. 89 and 90*



A



B

Coochbehar : Gold coins of Shah Alam II; A, obverse; B, reverse. See p. 90



A



B



C

Hunsi fort : bronze images. *See p. 92*



A



B

A, *Ranpuriya : Ganesa*; B, *Gulgaon : nag and nagi*. *See pp. 100 and 38*



A



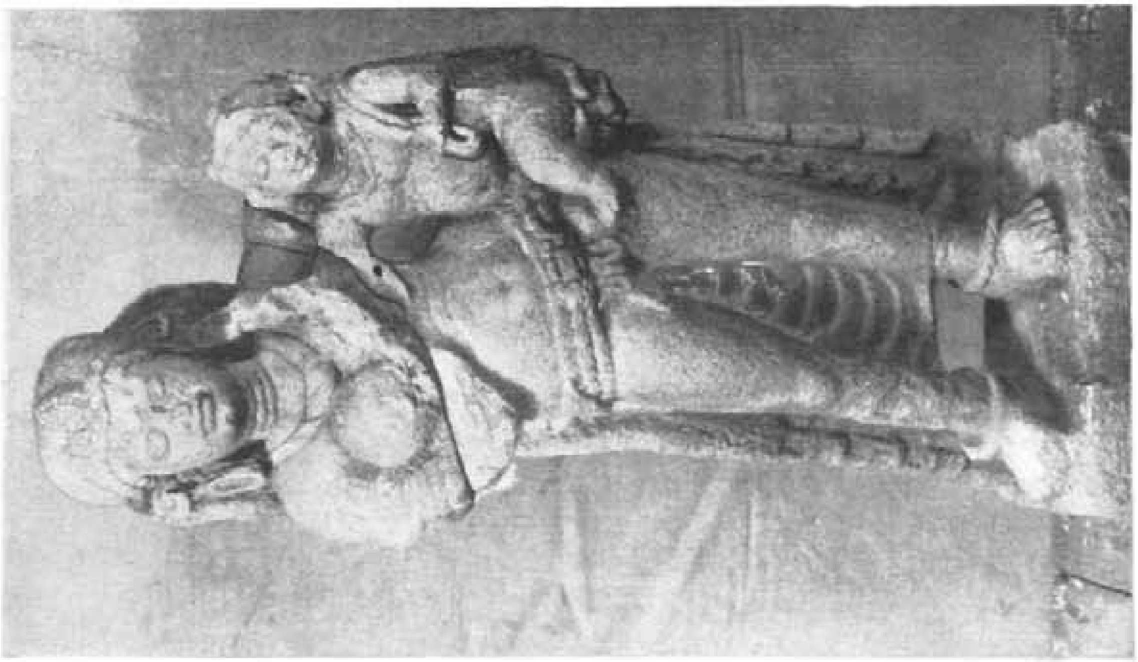
B



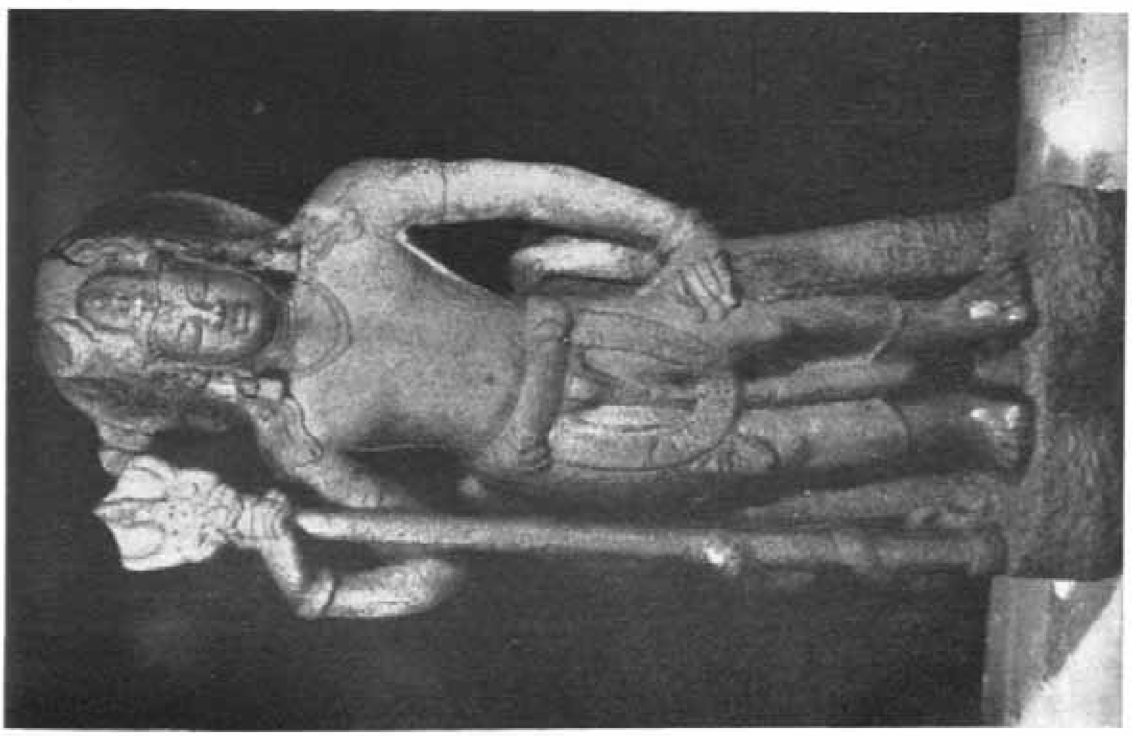
C

Government Museum, Almora : A, Parvati; B, Vishnu; Government Museum, Madras : C, Venugopal.

See pp. 107 and 108

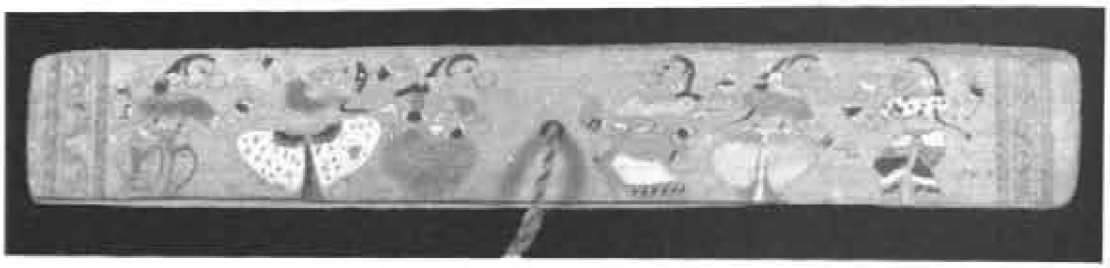


B



A

Prince of Wales Museum : A, *Siva*; B, *Skanda-mata*. *See p. 107*



A

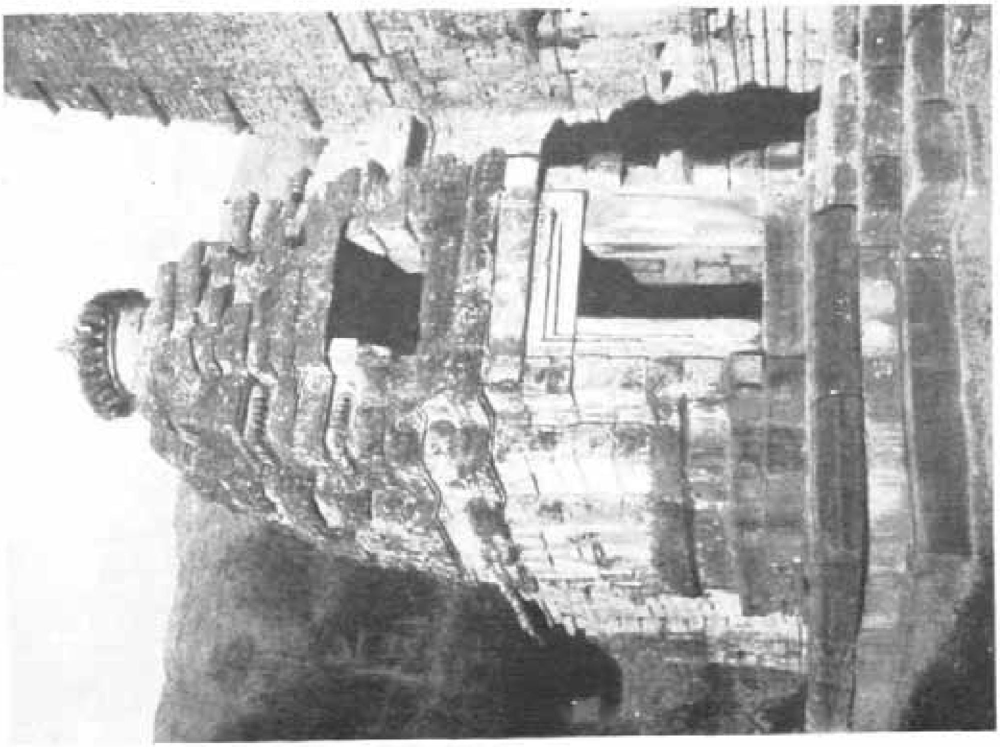


B



C

A, *Asutosh Museum, Calcutta : palm leaf manuscript*; B, *State Museum, Lucknow : terracotta head*; C, *Government Museum, Mathura*: *headless Indra*. *See pp. 107 and 108*

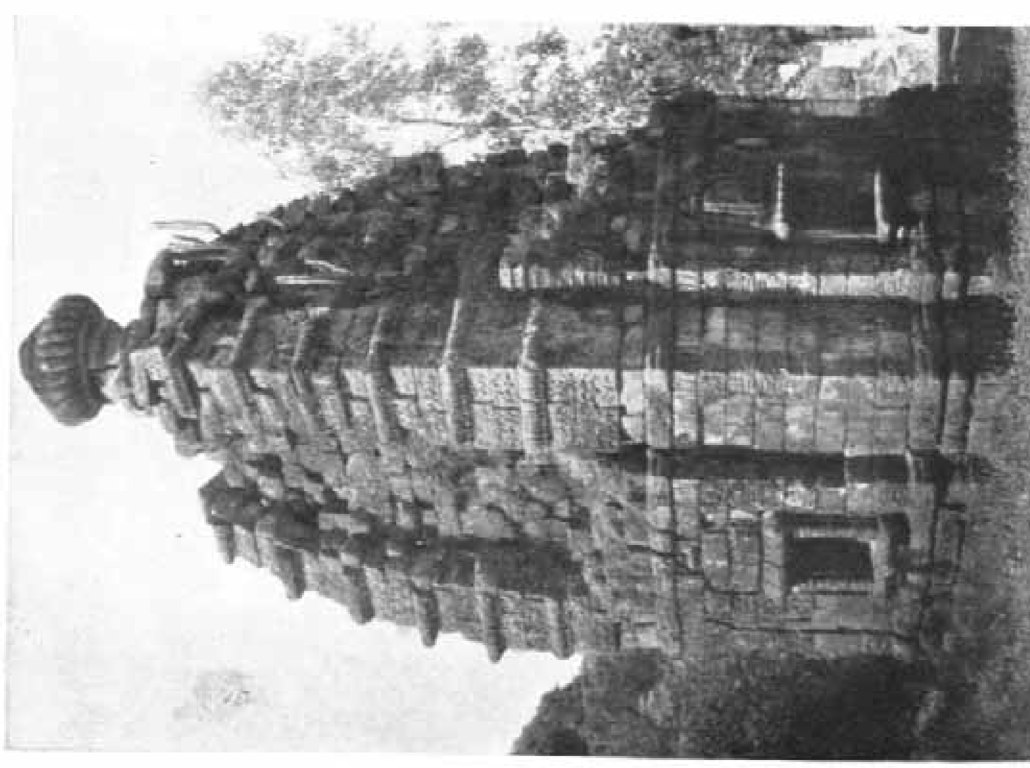


B

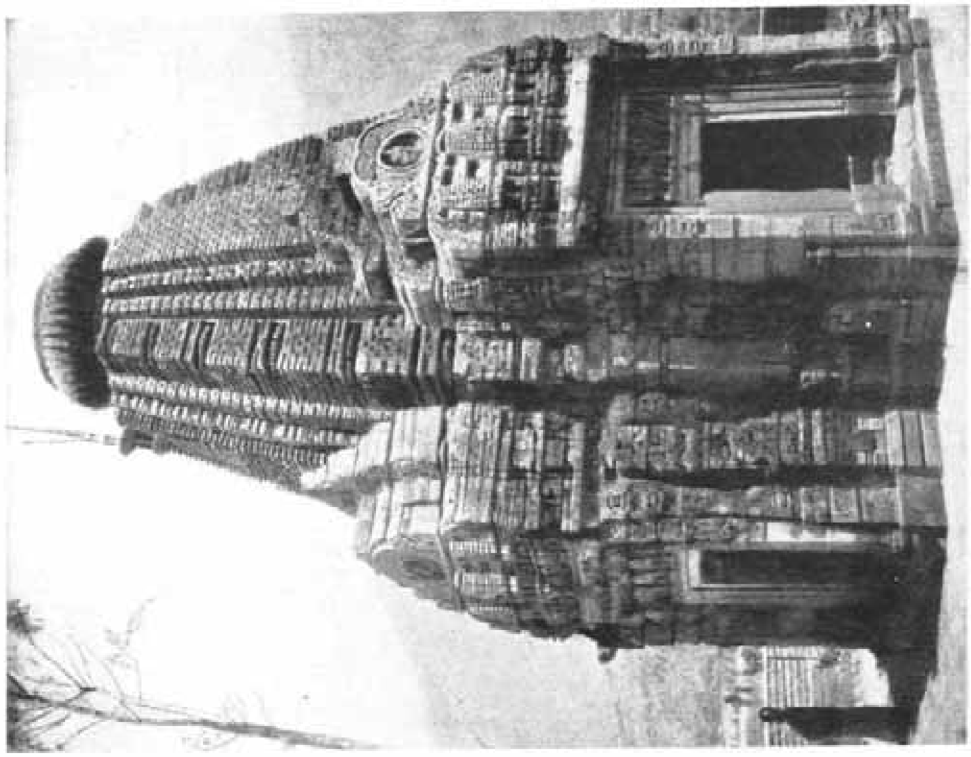


A

A, Masrur : Group of rock-cut temples; B, Baijnath. See p. 110

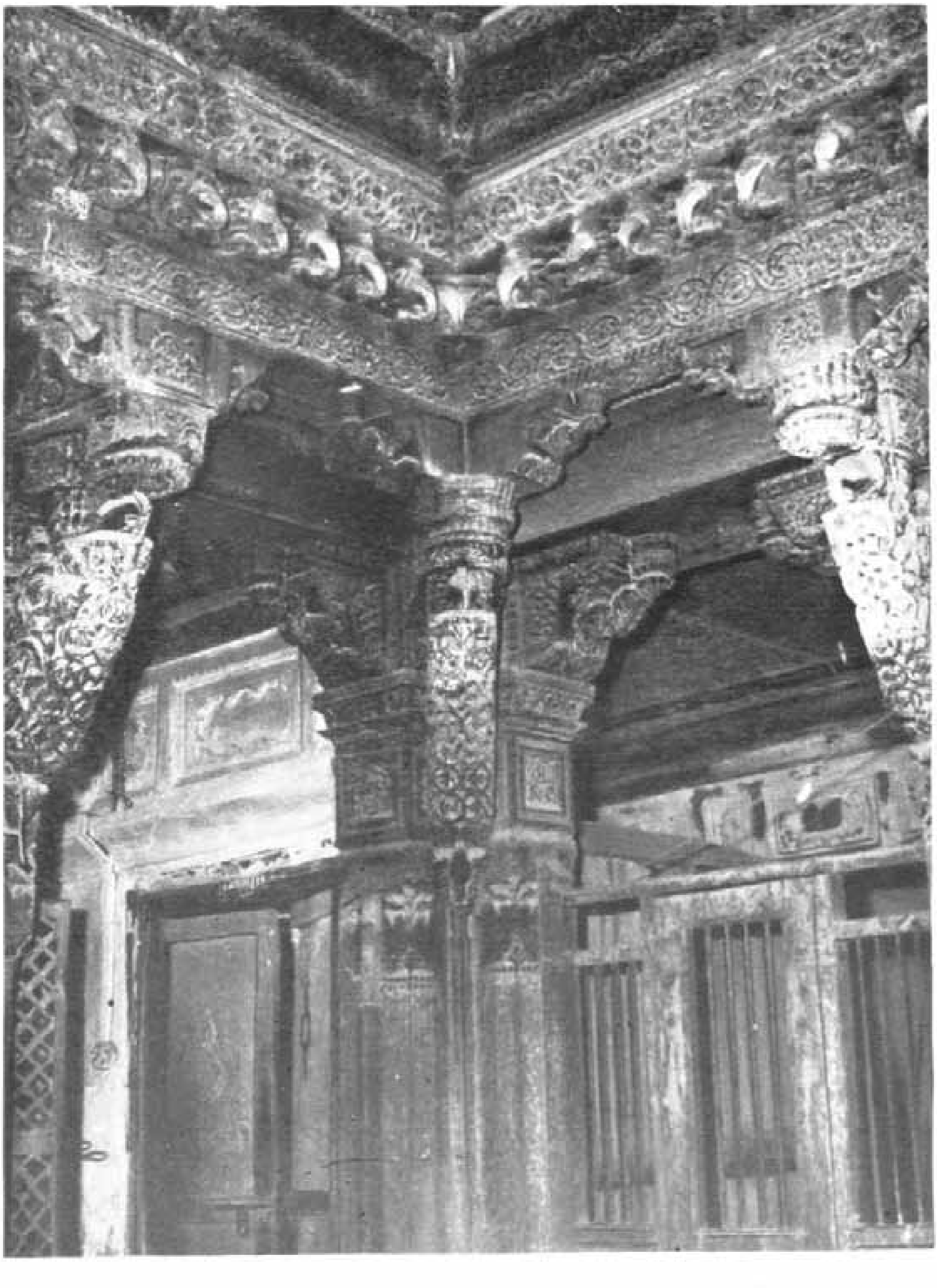


A



B

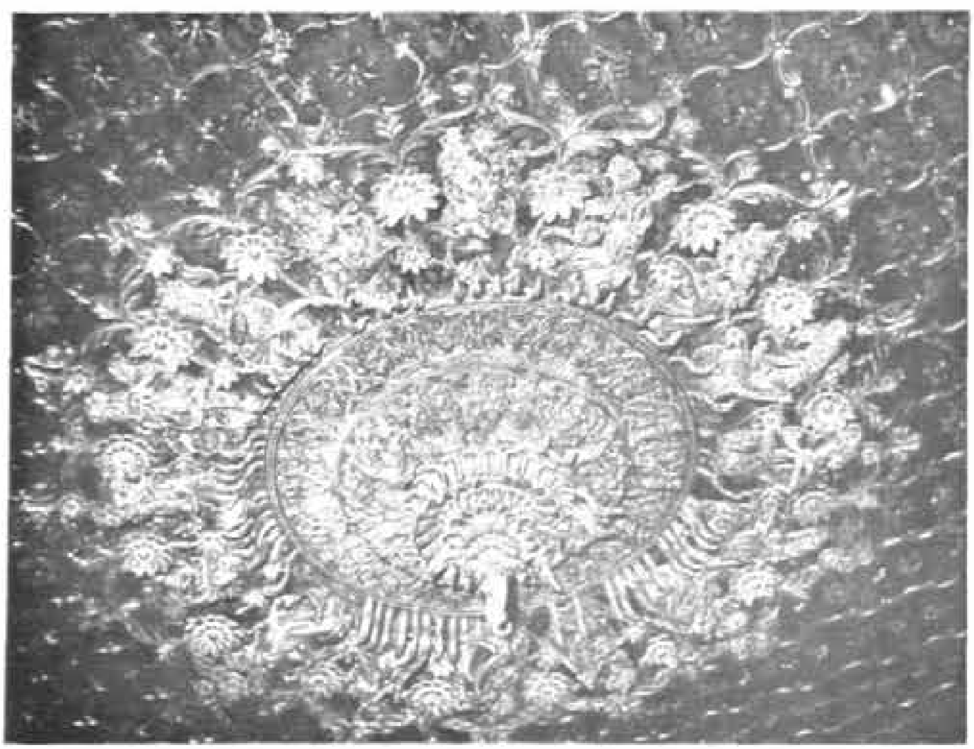
A, *Mandi : Siva temple*; B, *Baijnath atiratha temple*. *See p. 110*



Vadodara : Haveli of Suresho Desai; carved decorations. *See p. 111*

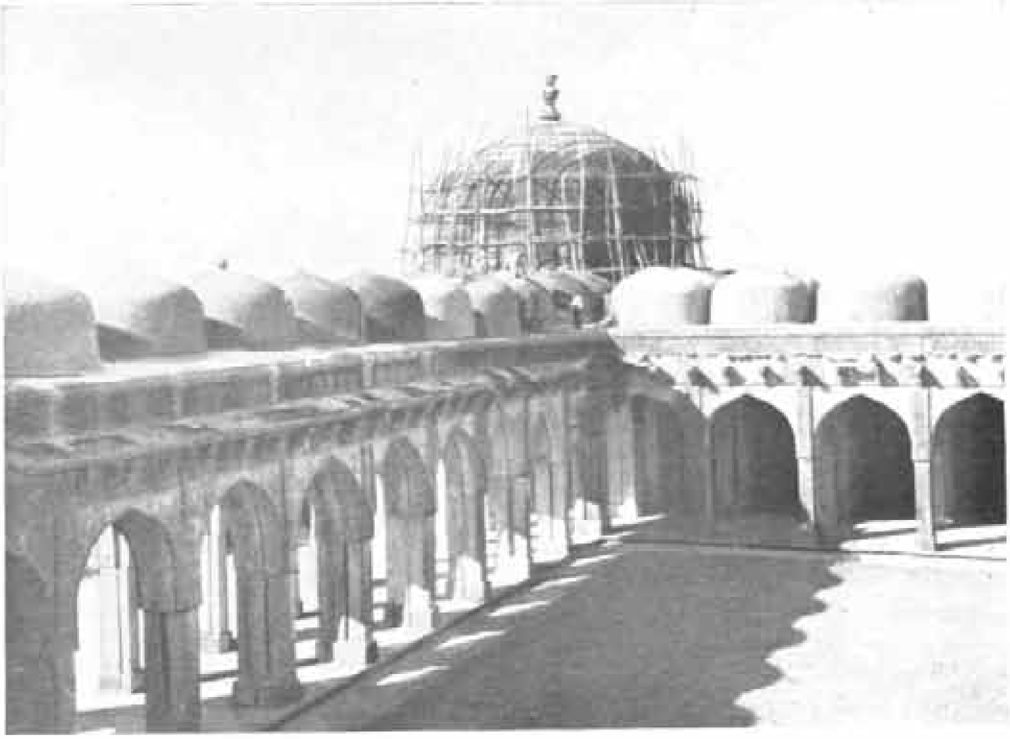


A



B

Vasa : *Haveli of Vithal Bhai* : A, *Facade of the haveli*, B, *wooden decorative ceiling*. *See pp. 111 and 113*



A



B

Mandu, Jami Masjid : A, *before and* B, *after conservation*. *See p. 116*

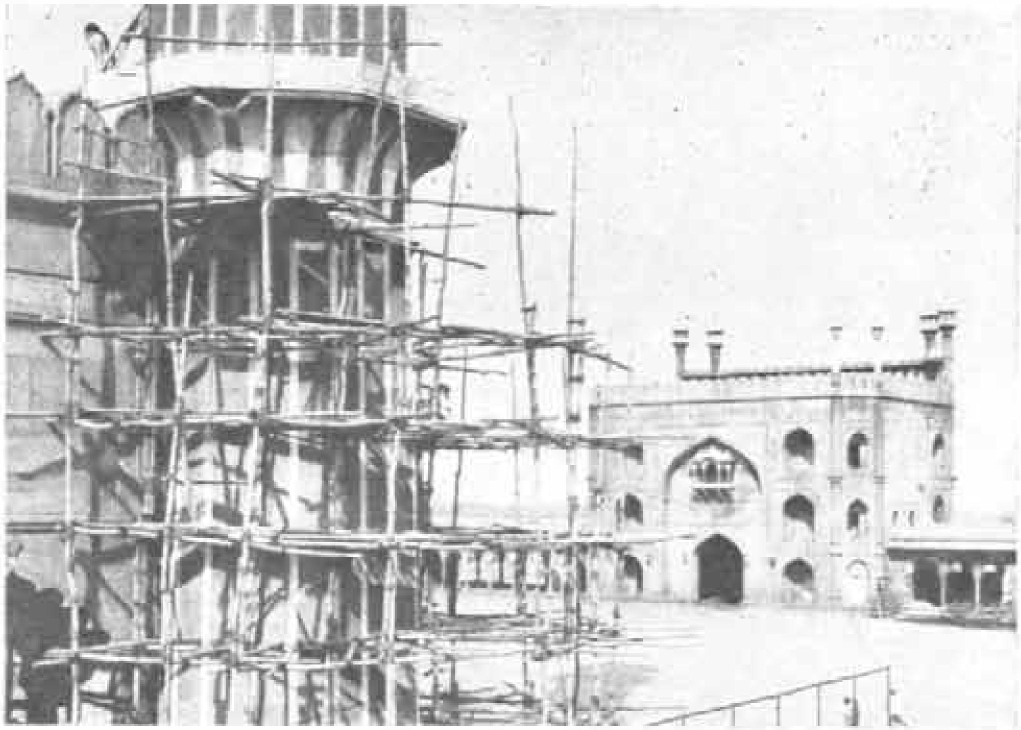


A



B

Un; Chanbara Dera, temple No. I : A, before and B, after conservation. *See p. 117*



A

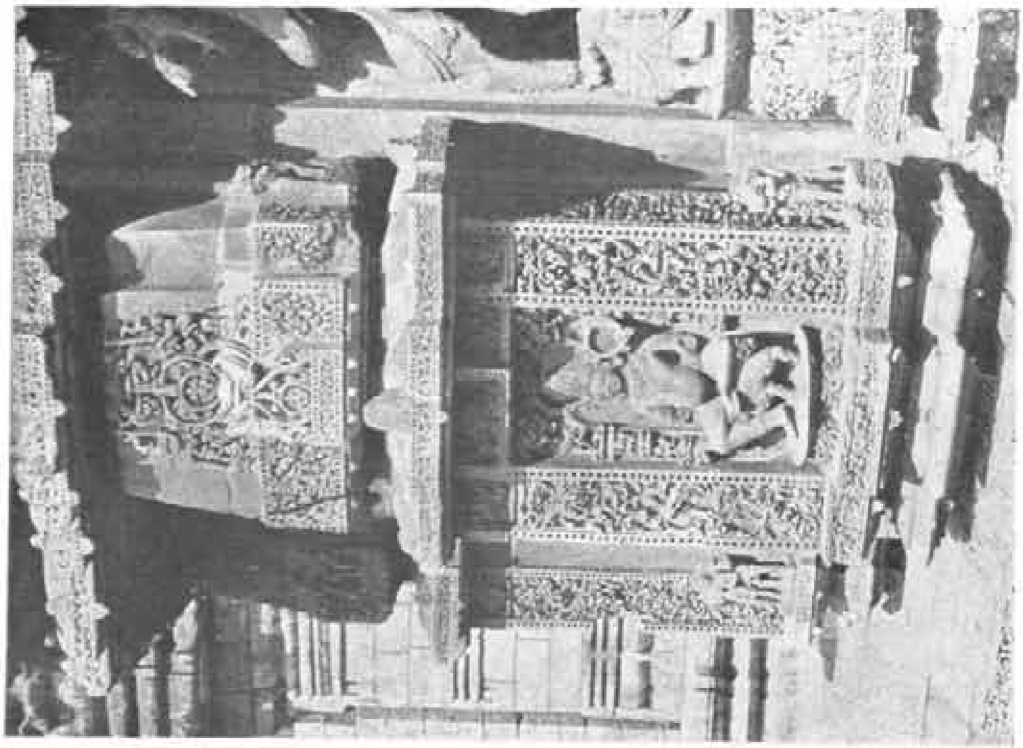


B

Delhi, Jami Masjid: A, *before and* B, *after conservation. See p. 118*



A



B

Bhubaneswar, Lingaraja temple: A, before and B, after conservation. *See p. 120*

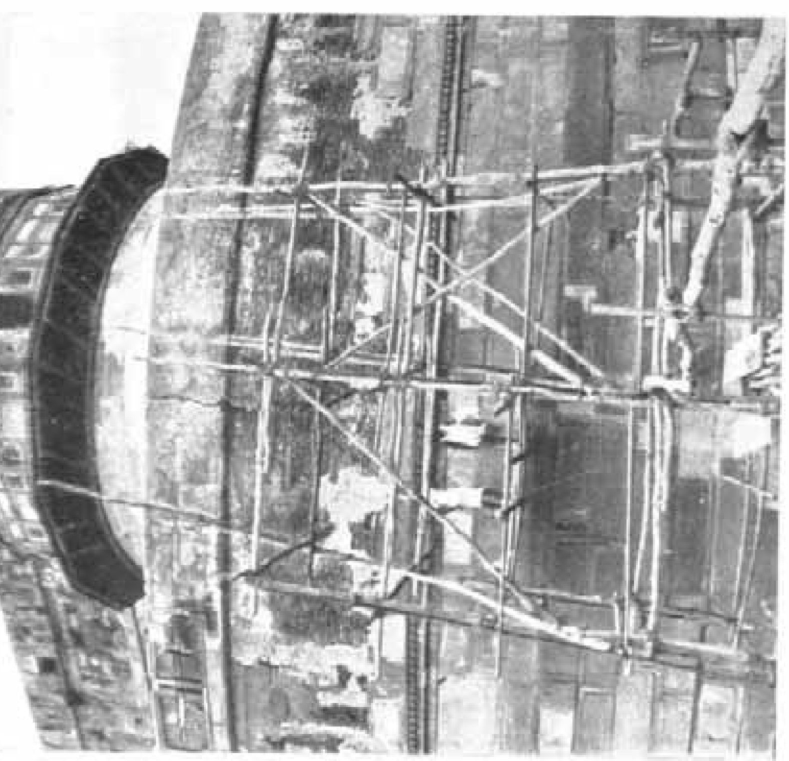


A

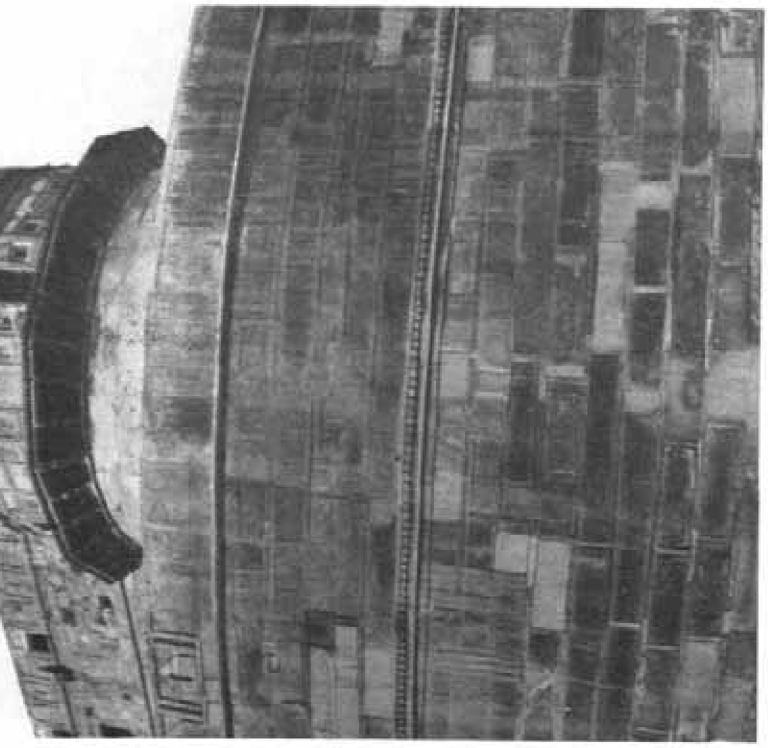


B

Murshidabad, Katra Masjid: A, *before and* B, *after conservation*. *See p. 120*



A

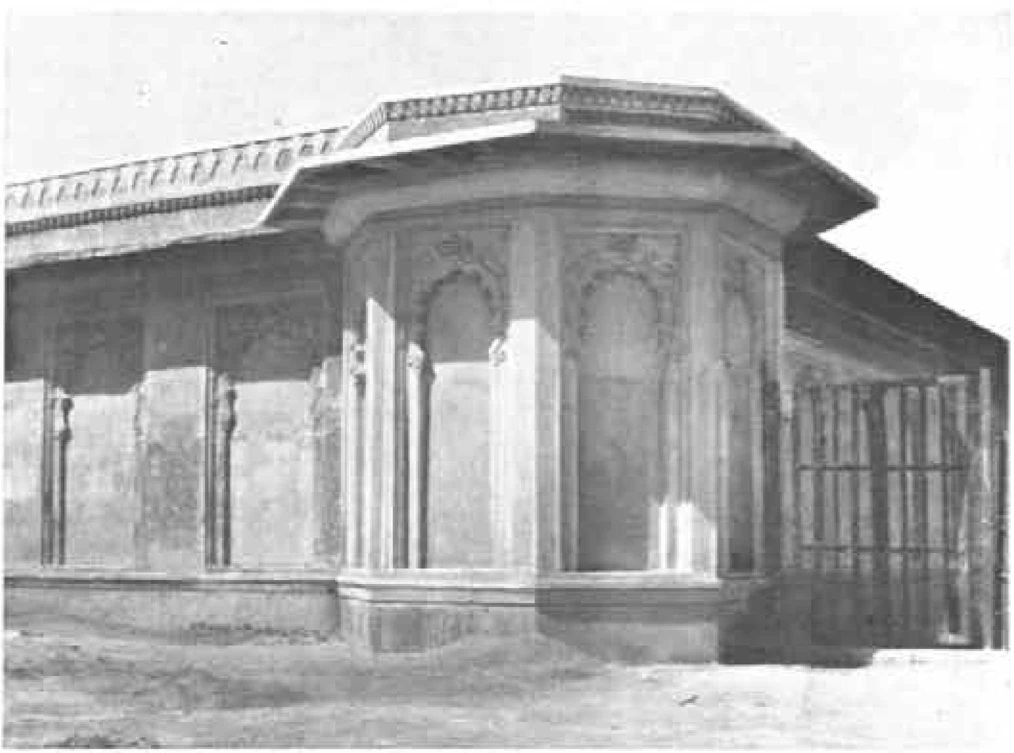


B

Agra, Agra Fort, south-eastern bastion : A, before and B, after conservation. *See p. 124*

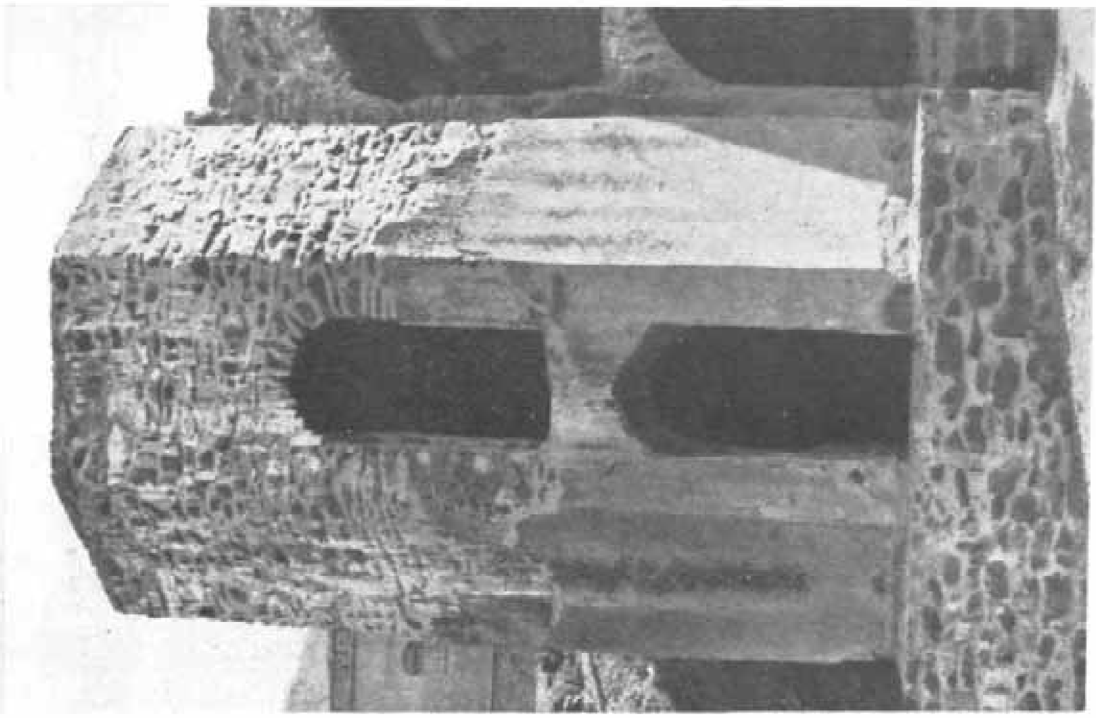


A

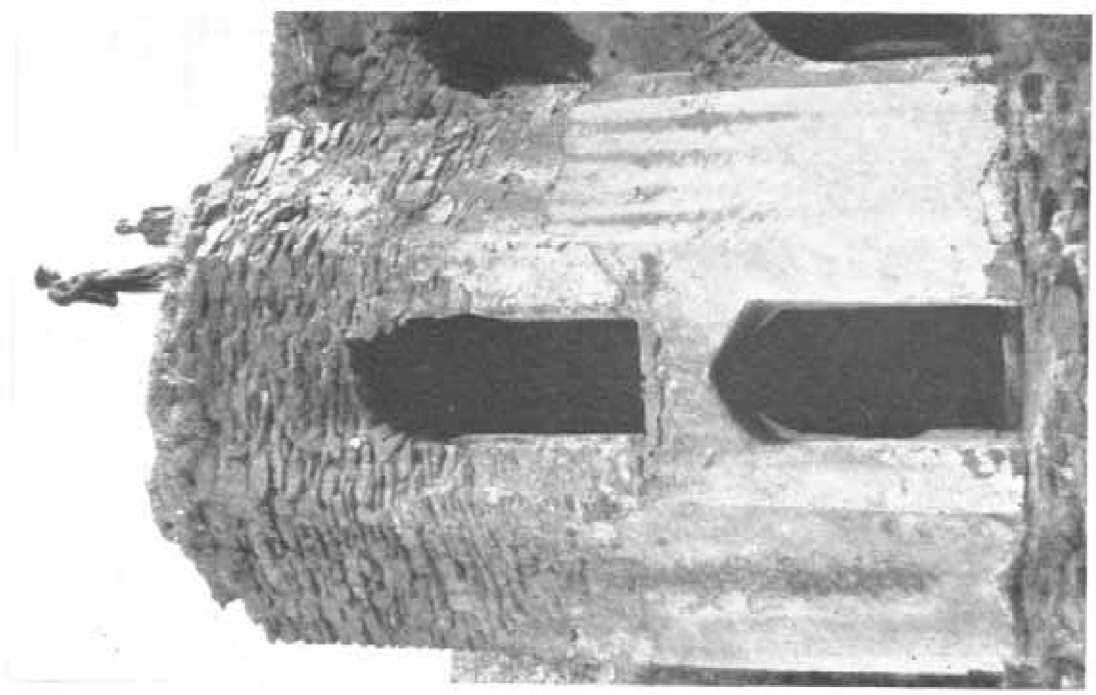


B

Jhansi, Raja Gangadhar Rao's Chhatri : A, *before and* B, *after conservation.*



B



A

Srinagar, Parimahal : A, *before and* B, *after conservation.* *See p. 127*

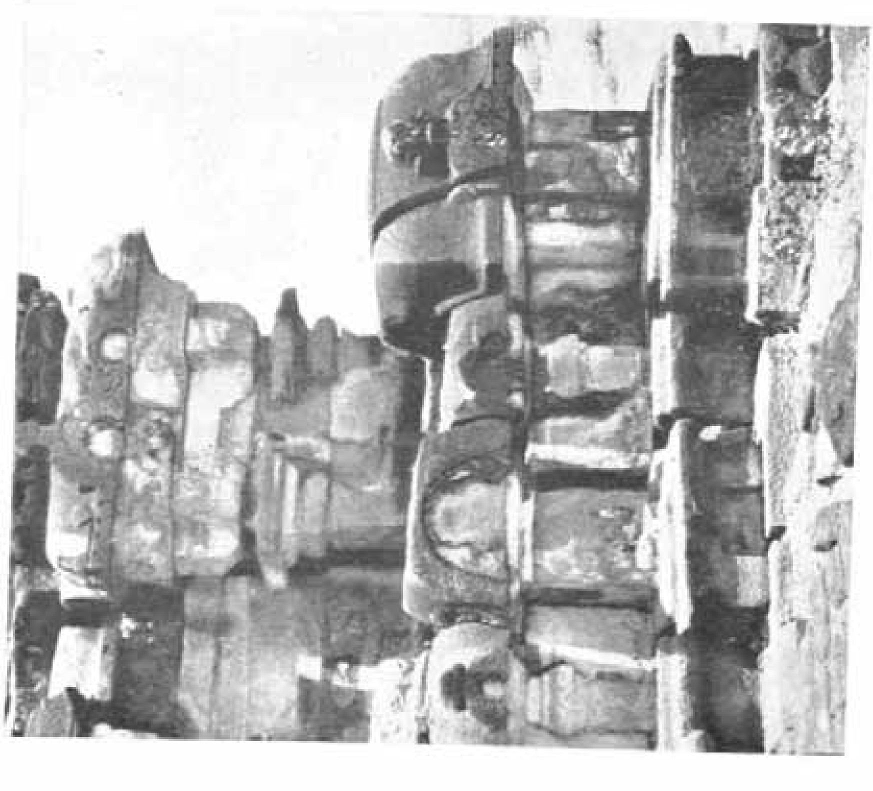


A

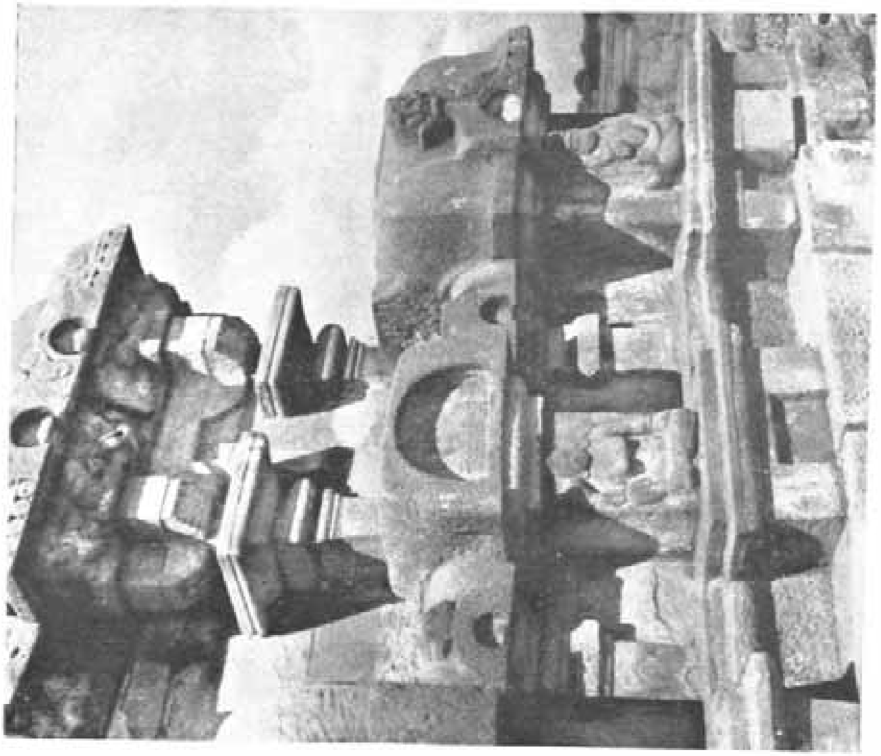


B

Udhampur, Kala Dera temple No. 1 : A, *before and* B, *after conservation.* *See p. 128*

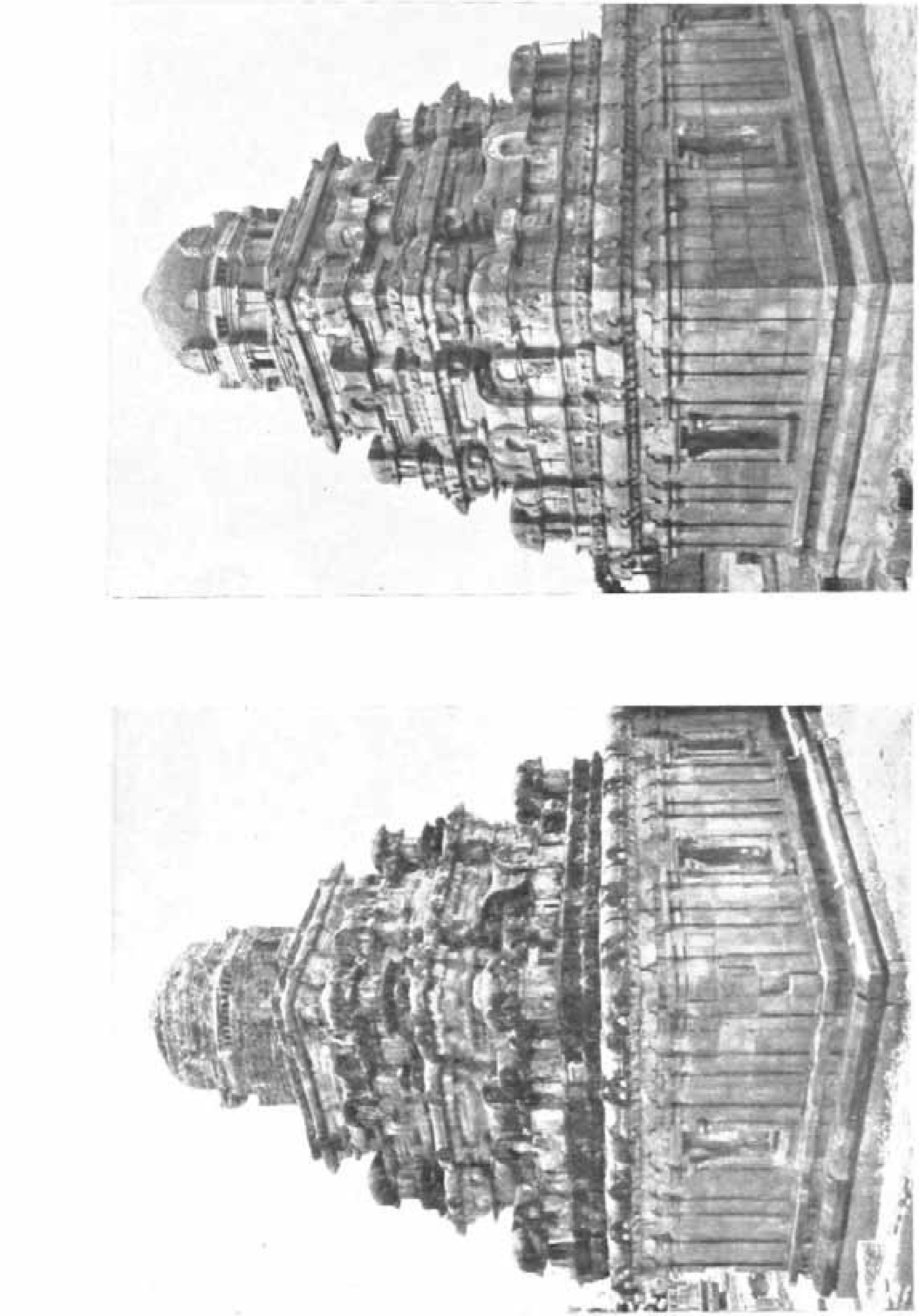


A



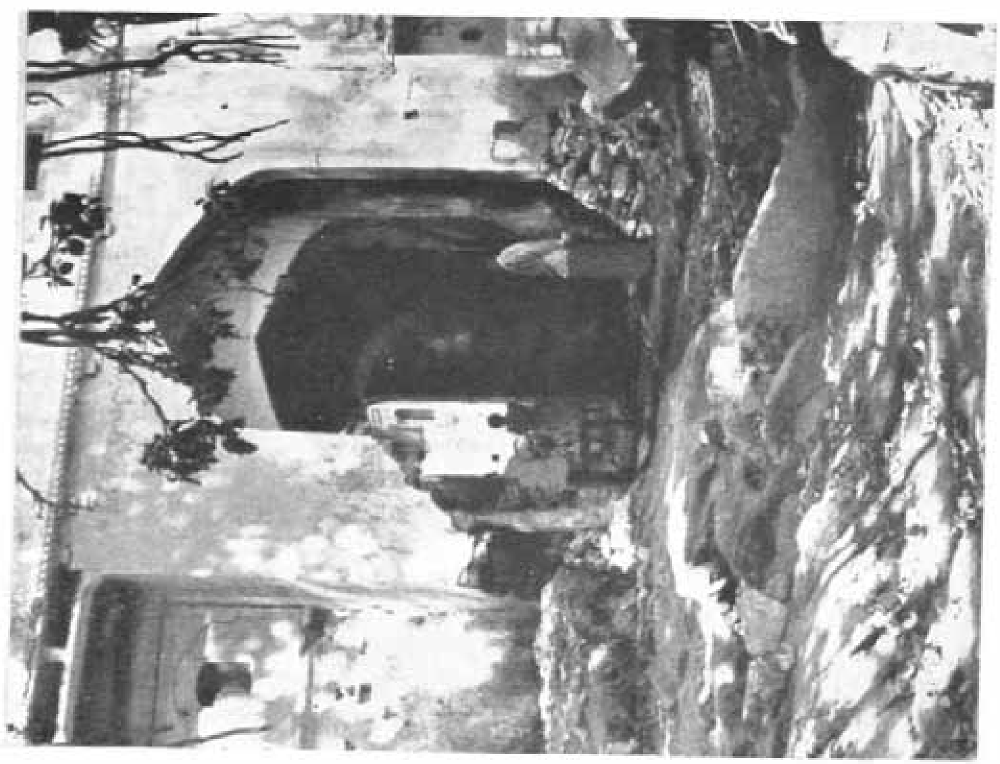
B

Nattery, Chandramaulisvara temple : A, *before and* B, *after conservation.* *See p. 129*

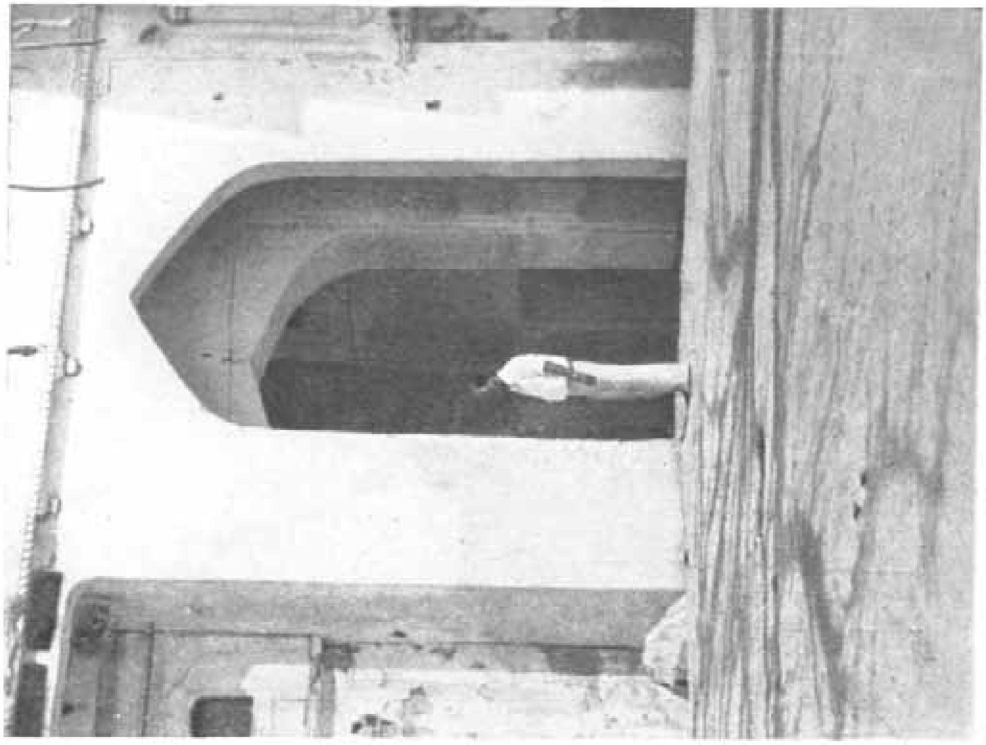


A B

Nattery, Chandramaulisvara temple : A, before and B, after conservation. *See p. 129*

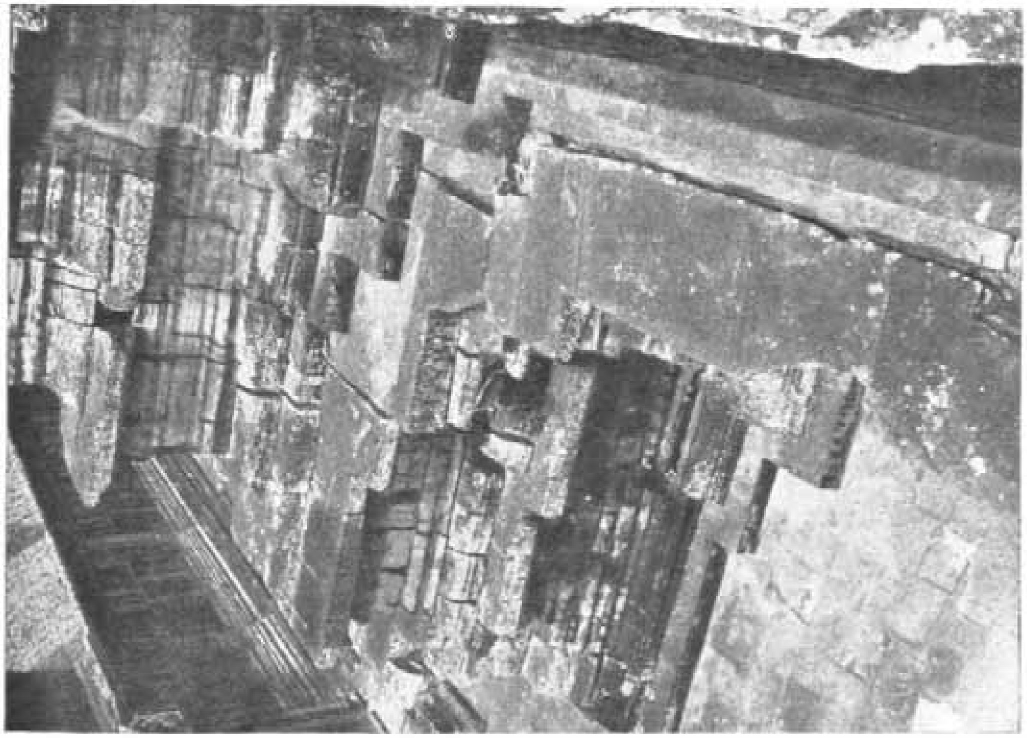


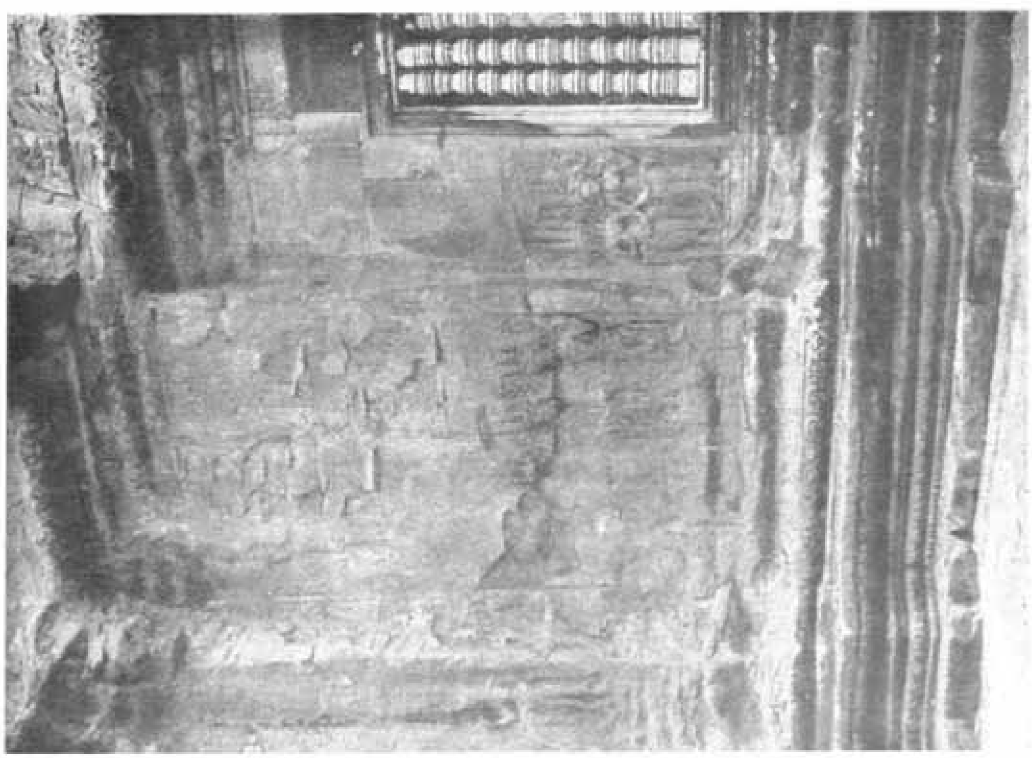
A



B

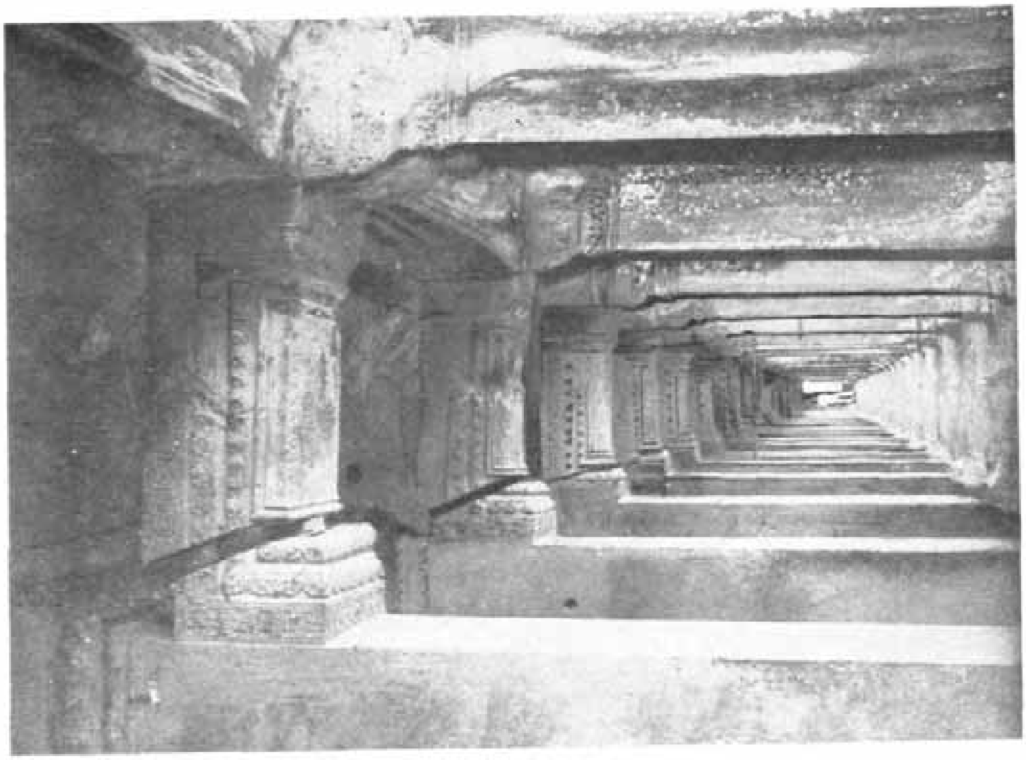
Galtaji Temple : A, *before and* B, *after conservation.* *See p.* 133



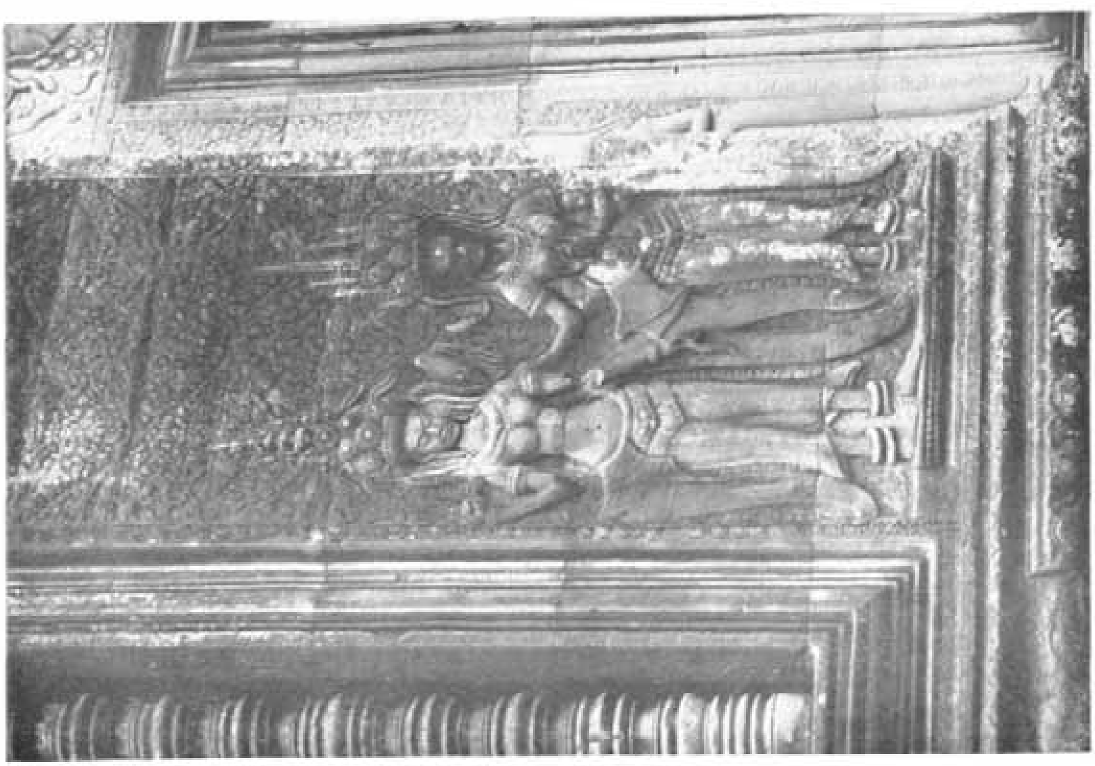


A B

Angkor Wat : A, eroded apsaras ; B, expanded joints. *See p. 137*

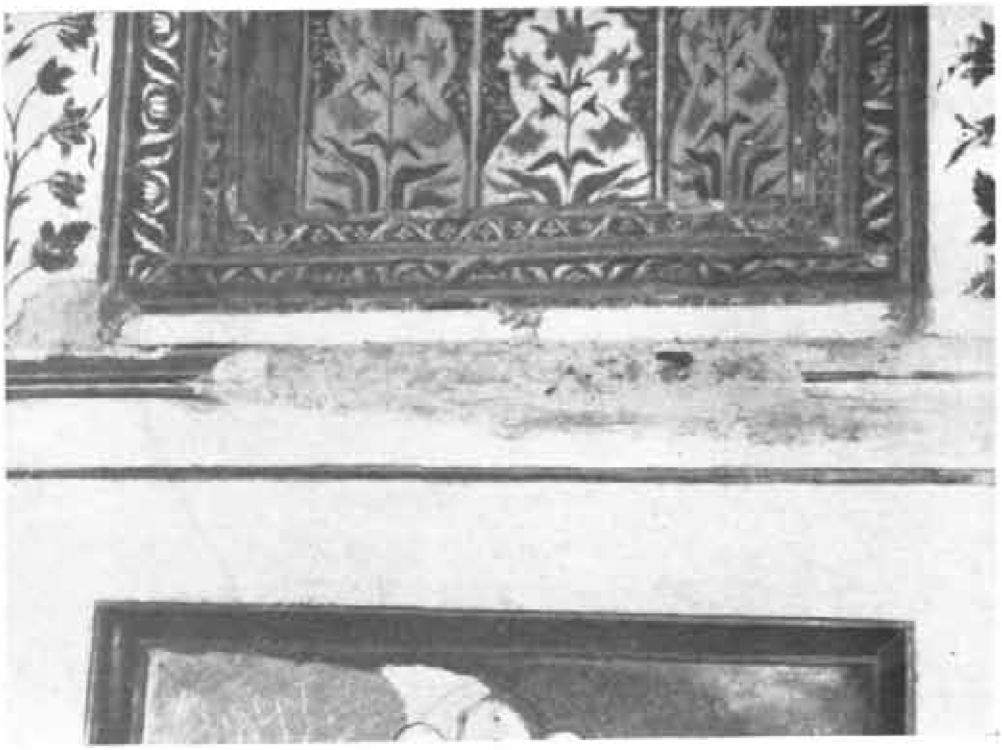


B



A

Angkor Wat : A, cracked tie-beams ; B, accretions on sculptures. See p. 137

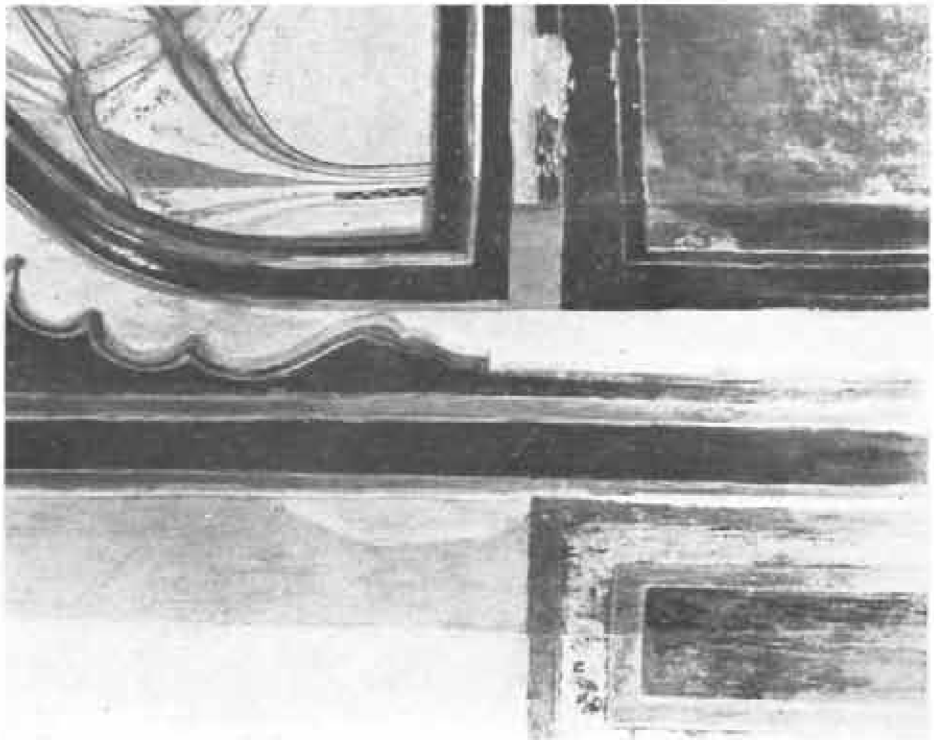


A

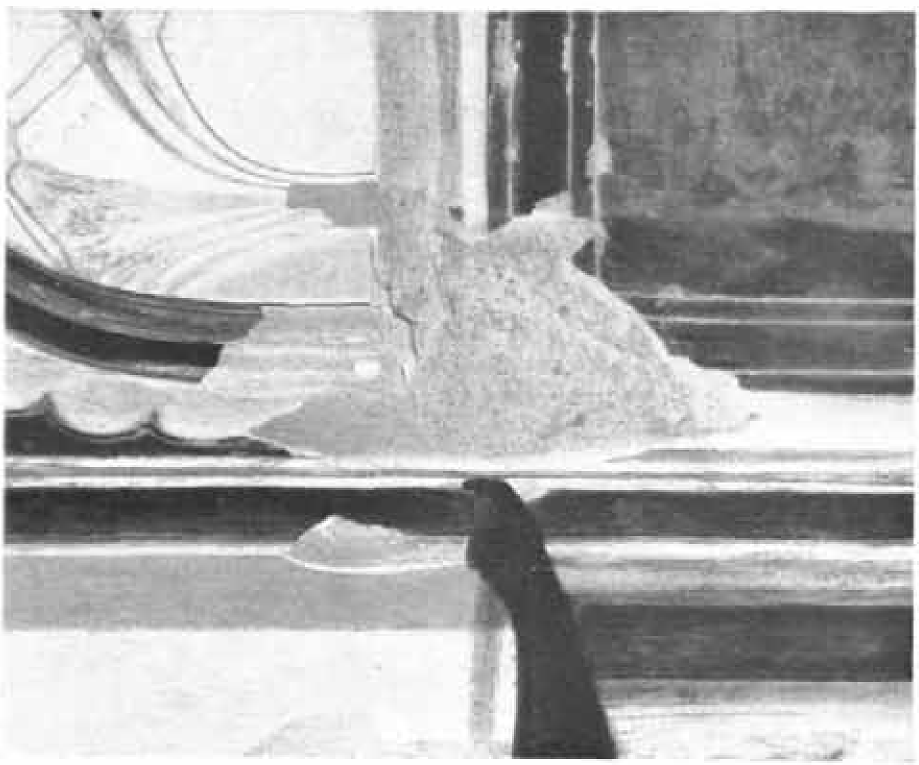


B

Burhanpur, Shah Shuja's tomb, floral designs : A, before and B, after resetting. *See p. 141*

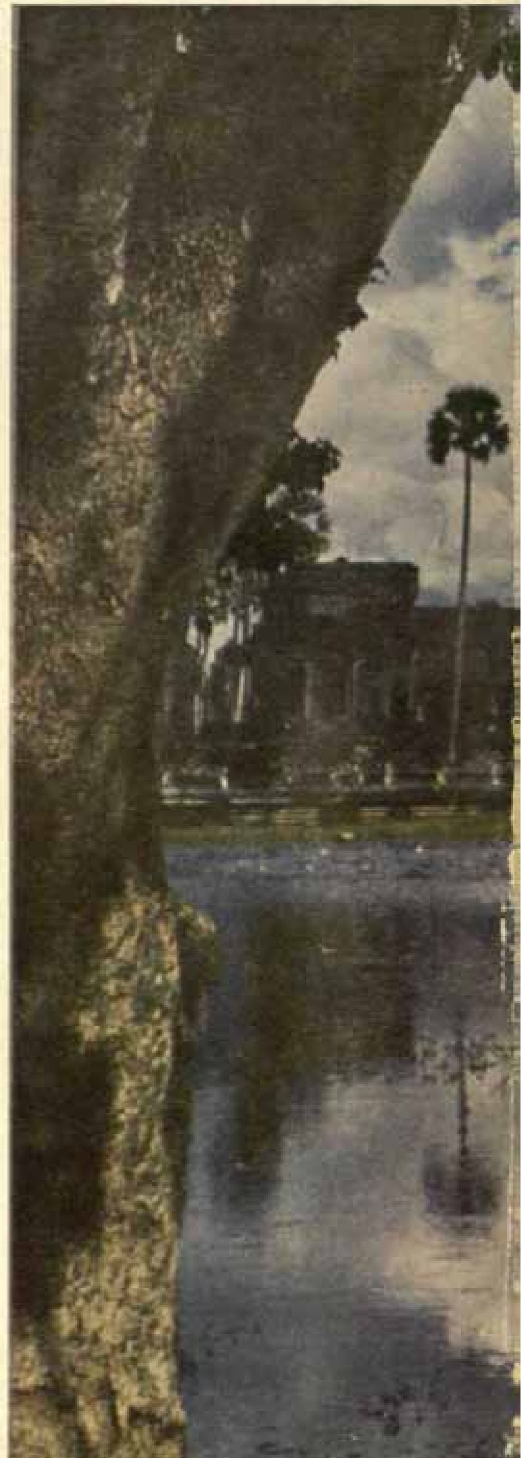


B



A

Burhanpur, Shah Shuja's tomb : A, *before and* B, *after chemical treatment.* *See p. 141*



ARCHAEOLOGICAL SURVEY OF INDIA